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ABSTRACT

Designed to be of value to both occupational curriculum personnel and those persons concerned with noncurriculum issues of occupational description and updating of job content information, this volume is the fourth of a five-volume set describing a systematic approach for constructing task inventories, surveying the task performance of occupations, and analyzing survey data to determine the appropriate performance content for job training. Expanding upon the volume 3 (CE 013 195) procedures for conducting an occupational survey of task performance, this companion volume adds additional elements to produce an information base for use in making certain decisions about curriculum content. Procedures are focused on pre-employment preparation, serving to prepare an individual for employment in a particular occupation. In addition to supplementing volume 3, this volume is also designed for use by curriculum developers in deriving or verifying the appropriate task content of training programs. Descriptions of four activities (presented in separate sections) are included: planning survey design and analysis, processing survey data, stating the terminal performance objectives (TPOs), and considering the possible uses of TPOs. Possible task-training questions, an employer expectation questionnaire, and an example of a summary of training need for 150 tasks relevant to general secretaries are appended. (SH)

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Research and Development Series No. 124

PERFORMANCE CONTENT FOR JOB TRAINING

VOLUME 4:

DERIVING PERFORMANCE REQUIREMENTS FOR TRAINING

Harry L. Ammerman
Duane W. Essex

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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- Generating knowledge through research
- Developing educational programs and products
- Evaluating individual program needs and outcomes
- Installing educational programs and products
- Operating information systems and services
- Conducting leadership development and training programs

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FOREWORD TO VOLUME 4

The Center for Vocational Education is continuing programmatic research to develop more effective procedures for identifying valid and necessary curriculum content. One product of this effort is the five-volume description of procedures for constructing task inventories, surveying the task performance of occupations, and analyzing survey data to aid curriculum planners and developers in determining the appropriate performance content for job training. The procedures are intended to be of value to both occupational curriculum personnel and those persons concerned with non-curriculum issues of occupational description and updating of job content information.

This set of procedures revises and considerably expands upon an earlier version of task inventory and survey procedures in The Center's report authored by William Melching and Sidney Borcher, R&D Series No. 91, *Procedures for constructing and using task inventories*, March 1973. The initial procedures profited greatly and drew heavily from the report by Joseph Morsh and Wayne Archer at the USAF Personnel Research Laboratory, *Procedural guide for conducting occupational surveys in the United States Air Force.* Center development of the inventory and survey process has concentrated on their adaptation to purposes of helping in the derivation of curriculum content. This adaptation has included greater concern for how a task is stated, what task information should be obtained, and how to use this task information in selecting the more relevant and critical content that warrants consideration as a learning objective.

The total set of volumes in this series consists of the following titles:

Volume 1: Introduction.

Volume 2: Stating the tasks of the job.

Volume 3: Identifying relevant job performance.

Volume 4: Deriving performance requirements for training.

Volume 5: Processing survey data: Technical appendices.

This focus upon the performance content of specific occupations is parallel to The Center's concern for the *conceptual* and *affective* content of training, as published in earlier reports, R&D Series No. 98 and 105. Results of several research applications of portions of the process as it was being developed are published as R&D Series No. 86, 87, 88, 108, 109, and 110. Currently underway is an exploratory study of more generally-applicable skills that may be used in different occupational areas as well as within a particular occupation. Such occupationally transferable skills or competencies would seem to be useful complements to the present concern for job-specific content.

Volume 4, Deriving Performance Requirements for Training, provides a companion set of procedures to accompany the survey steps of Volume 3. These additional steps are used to seek information for making curriculum content decisions, along with the Volume 3 steps pertaining to the

job-relevance of task activities. Supplementing the relevance information, the companion procedures of Volume 4 are of use to curriculum developers in deriving or verifying the appropriate task content of training programs. As described in this volume, the procedures are focused on pre-employment preparation, serving to prepare an individual for employment in a particular occupation.

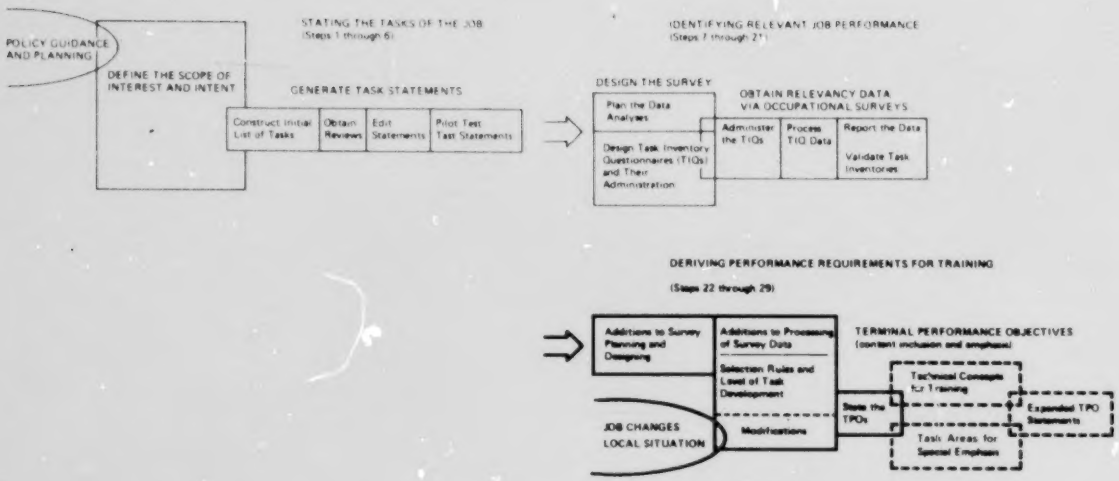
The procedures benefit from a variety of reported research studies and experiences of many persons over the last several years, notably that work sponsored and conducted by the USAF Personnel Research Laboratory. There also has been extensive input from the many vocational educators, curriculum developers, occupational instructors, employers, job supervisors, and workers themselves who have been involved in various aspects of trying out different portions of the process reported here.

Of particular note are the individuals in 27 cooperating business and service firms who responded to the Employer Expectation Questionnaires, as well as curriculum officials in 27 public and private postsecondary schools who completed the Curriculum Content Questionnaires. Together they performed most effectively in providing the necessary training content data that served as the criterion for establishing efficient task selection procedures. Supporting the development of these questionnaires was useful consulting advice by Jerome Moss, Robert Miller, Coit Butler, Douglas Sjogren, and Nevin Frantz. Within the project staff, the procedures of this volume benefitted from the advice and assistance of Frank Pratzner, Allen Wiant, Winston Horne, and Keith Widaman. Dr. Pratzner was director of the R&D program in which the five volumes of this set were developed. The work of which this volume is a part was sponsored by the Education and Work Group of the National Institute of Education, with Robert Stump serving as Project Officer.

Continued improvement can be anticipated as wider experience is gained in the implementation of task inventories and occupational surveys. It is hoped the present procedural descriptions may be of immediate use and value in aiding and promoting such implementation. By such means there should be increasing assurance that curriculums and instructional materials provide for those things most appropriately learned in a training program, and that students will be learning skills which are important to and required for effective job performance.

Robert E. Taylor
Executive Director
Center for Vocational Education

THE FOCUS OF VOLUME 4


POLICY GUIDANCE AND PLANNING
DEFINE THE SCOPE OF INTEREST AND INTENT
STATING THE TASKS OF THE JOB (Steps 1 through 6)
GENERATE TASK STATEMENTS
Construct Initial List of Tasks
Obtain Reviews
Edit Statements
Pilot Test Task Statements
IDENTIFYING RELEVANT JOB PERFORMANCE (Steps 7 through 21)
DESIGN THE SURVEY
Plan the Data Analyses
Design Task Inventory Questionnaires (TIQs) and Their Administration
OBTAIN RELEVANCY DATA VIA OCCUPATIONAL SURVEYS
Administer the TIQs
Process TIQ Data
Report the Data
Validate Task Inventories
DERIVING PERFORMANCE REQUIREMENTS FOR TRAINING (Steps 22 through 29)
Additions to Survey Planning and Designing
Additions to Processing of Survey Data
Selection Rules and Level of Task Development
Modifications
JOB CHANGES LOCAL SITUATION
TERMINAL PERFORMANCE OBJECTIVES (content inclusion and emphasis)
State the TPOs
Technical Concepts for Training
Task Areas for Special Emphasis
Expanded TPO Statements

Expanding upon the Volume 3 procedures for conducting an occupational survey of task performance, the companion effort described in Volume 4 adds elements to produce an information base for use in making certain decisions about curriculum content. The intent is to narrow and focus the curriculum specialist's attention on those tasks and task areas where more detailed description and analysis is most warranted for curriculum development purposes.

The purpose of this section of the process is to identify job performance content that is most essential for consideration in training programs preparing individuals for an occupation prior to regular employment at such work. The process uses an empirical base of timely performance data and judgments provided by persons close to the current performance situation; that is, by workers and supervisors who as a group are representative of a wide scope of work situations.

Curriculum content is identified by this process on the basis both of its *inclusion* and its *emphasis* in a training program. "Inclusion" is concerned with whether each particular task of an occupation should or should not receive *some* consideration in the curriculum. "Emphasis" is concerned with the level of development of task performance ability and with what particular non-performance features, if any, are especially important for training attention. Thus, curricular emphasis pertains both to the *degree and areas of task competency* intended to be acquired by students.

These components of content identification are operationalized in the present procedures, particularly concentrating on the issues of *inclusion* and *degree of emphasis*. Though suggestions are presented for identifying *areas of emphasis*, procedures for this latter component cannot at this time

be as fully recommended. Further development and tryout of area identification procedures would be useful. However, the present suggestions should be helpful to curriculum developers in the interim.

Basically, this procedure for curriculum content identification uses field data about each possible task of an occupation to answer two questions:

1. Of the tasks that are relevant to the occupation, which should be included in the intended training curriculum?

2. For a task that is to be included, what should be emphasized in the training of that task?

This second question has several aspects to it. Should students acquire a basic ability to perform the task, or should the subject be limited to certain background knowledge or introductory concepts? Or, should *both* task performance and related technical knowledge be involved? If actual ability to perform the task is to be intended, should the training include development of proficiency to perform to standards of speed, accuracy, and/or excellence?

It is presumed that performance competency for some tasks is better acquired through job experience, whereas for other tasks a high level of proficiency may be expected to result from the training program. In some cases the student may only need to be aware that a task is part of the occupation, with a very general knowledge of how it is to be performed. Or, perhaps, the task itself is not critical for training; but the operation or use of a machine, tool, instrument, or other device that aids and supports task performance should be the focus of the learning. The same might be true of certain specialized technical knowledge having practical use to workers in the effective job performance of a task.

Identification of these curriculum content factors for each job-relevant task is the purpose of the procedures in this volume. Should anything about the task be taught at all; and, if so, what?

Together with these questions, curriculum planners and developers have another concern. It sometimes becomes unreasonable to include everything in the curriculum that might be relevant and useful. If due to limitations in time or resources some content must be omitted from a particular training program, how can the actual content and the omitted portions be communicated to students, employers, and responsible policy agencies? The procedures in this volume provide one means for reporting the intended training content for each task of an occupation.

All of the procedural steps of Volume 3, except Step 18 (Cluster Workers Into Job Types), are appropriate to the deriving of job performance requirements for training. *It is presumed that a single occupation or job type has been defined for the focus of the occupational survey.*

Volume 4 here conveys procedures and guidelines for adding to the questionnaire survey and analysis processes. Essentially, additional task questions are to be included in the Task Inventory Questionnaires (TIQ), to be administered along with those described in Volume 3. A process is then described for using all of this survey data to select tasks for inclusion in training. Portions of the resulting summary data are then used to identify the performance level to which each task should be developed. Instructions and examples are given on how to state these conclusions in the form of Terminal Performance Objectives (TPOs), which serve to record and communicate to others the derived curriculum content. As mentioned previously above, a suggestion is also given for expanding TPO statements to include appropriate emphases for areas of task competency. Additionally, a suggestion is made for including significant technical concepts that may warrant training in the context

of certain task performance. Figure 1 depicts the sequence and component steps of these activities. Procedural steps are consecutively numbered to follow those described in Volume 3. These are grouped for convenience under three major activity headings.

As with the task questions dealing with job-relevancy, several options are presented for types of questionnaire surveys. These options serve to accommodate various special situations and circumstances in which an occupational survey may need to be conducted.

For establishing pre-employment training content, it is important that Worker questionnaires be administered to persons having some but not extensive amounts of work experience in the occupation. Supervisors should be instructed to focus their ratings on such a worker population. It is this feature of attending to a particular type of worker (as informant or as the focus of other judges) that permits task relevancy and significance to be effective indicators of appropriate training content.

It should be cautioned that these procedures for deriving training content are not infallible. The procedures, though effective and efficient for a variety of occupations, do yield an element of potential error in selecting or rejecting tasks for training. The error is minimal, and tends to occur in regard to tasks which are near the dividing point between the need and non-need for training attention. Results should always be examined and reviewed for apparent errors. Information from other sources available to training agencies, beyond that collected from workers and supervisors by the Task Inventory Questionnaires, can bring additional facts to bear upon the curriculum content decision. The value of the present procedures is that they systematically obtain and use specific information from the field to identify and resolve many of the content inclusion and emphasis decisions, freeing the curriculum planner and developer to concentrate further attention on fewer points.

Another caution to be understood is that the curriculum content identified is not sufficient in itself to prepare actual lesson plans nor to design specific learning experiences. The resulting Terminal Performance Objectives point the direction and focus attention on the important training requirements. It is assumed that learning and subject matter specialists can readily provide the balance of detailed information about task procedures and the necessary enabling knowledges and skills for each identified training requirement. Where such information is not available, then task description and analysis studies may be conducted for those particular tasks. Techniques for conducting such studies are contained in a variety of other reference sources, with approaches differing as a function of the type of work performance or knowledge content that is characteristic of a particular task. Detailed task analysis procedures are beyond the scope of the present procedures, though the Terminal Performance Objectives do serve to focus such analyses upon the key areas of a task that most warrant attention in subsequent task analyses.

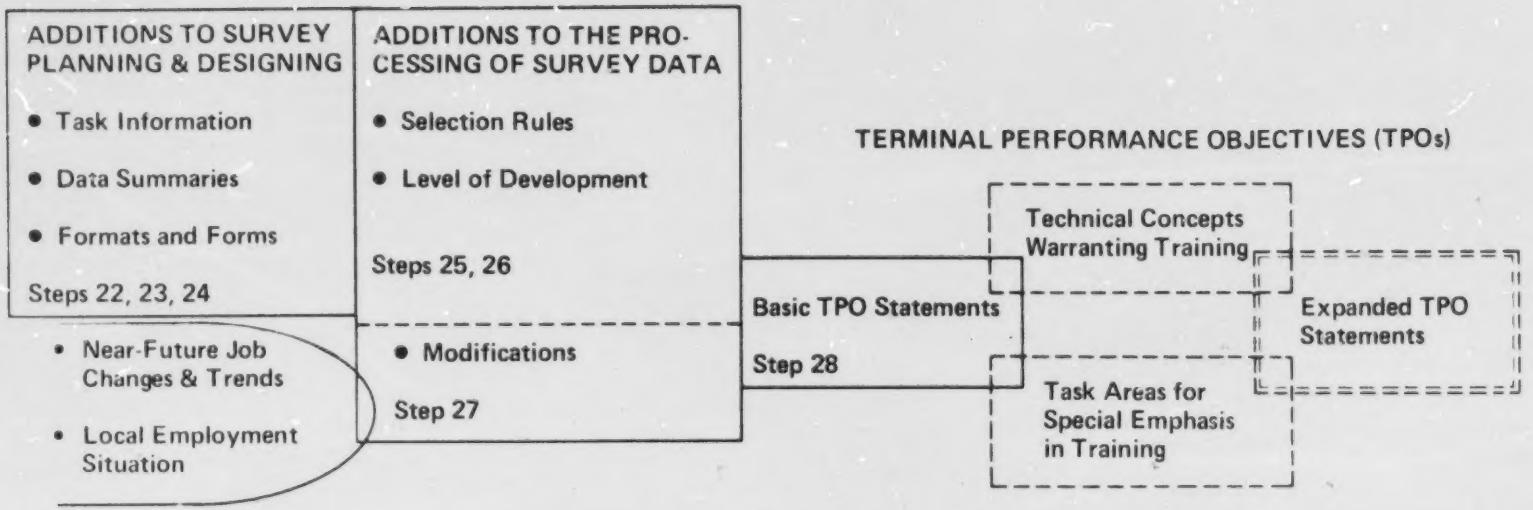
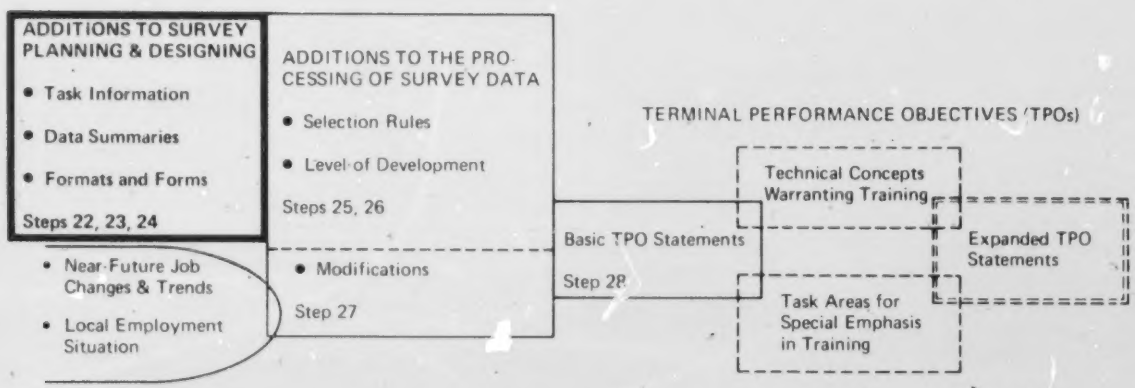


Figure 1. Procedural steps described in Volume 4. Dash-lined boxes indicate tentative, untested suggestions for expansion of basic TPO statements.

ACTIVITY H: PLANNING SURVEY DESIGN AND ANALYSIS (ADDITIONS TO ACTIVITY D)



Procedures described for this activity serve to expand the planning of occupational surveys to include designs and analyses that are useful for selecting what job performance content should be included in pre-employment training programs. These procedures build upon the identification of task relevance to an occupation, as described in Volume 3. They are intended to be accomplished concurrently with survey planning in Activity D when curriculum content selection is the purpose of the survey. There are three procedural steps described here, paralleling Steps 8, 10, and 11:

- Step 22: Determine What Task Information Is Needed
- Step 23: Determine What Data Summaries and Analyses Are Needed
- Step 24: Design Questionnaire Format and Forms

STEP 22: DETERMINE WHAT TASK INFORMATION IS NEEDED

Task questions for selecting training content. In Step 8 of Volume 3 questions were introduced regarding the occurrence (Questions 1 and 2) and the significance (Questions 3 and 4) of the tasks of an occupation. These were arranged in five different types of survey questionnaires: Types A, B, C, D, and E.

Type	Workers		Supervisors	
	Group 1	Group 2	Group 1	Group 2
A	Question 3		Question 2	
B	Question 1	Question 3	Question 2	
C	Question 1	Question 3		
D	Question 1		Question 2	Question 4
E	Question 1		Question 4	

For use in selecting performance content for training, two versions of an additional task question are to be added in various ways to these questionnaire options. Using question numbers following those cited in Volume 3, these additional questions are:

6. *Learning Location* (asked of workers)

   Where should the main effort be made to learn each of the tasks of the job?

7. *Learning Location* (asked of supervisors)

   Where should the main effort be made to learn each of the tasks of the job?

Instructions and response scales for these questions are illustrated in Step 24.

It is useful to distinguish whether Questions 6 and 7 are to be administered along with a relevance question on Task Occurrence (Question 1 or 2), or along with a relevance question on the Extent the Task Is Part of the Position/Job (Question 3 or 4). To make this distinction, Questions 6 and 7 when used with Question 3 or 4 are labeled here as Questions 6A and 7A, respectively.[1]

Of several possible questions tried out in developing these procedures, the Learning Location question produced consistently high accuracy and group reliability in identifying appropriate training content when used along with questions on task relevance. Questions 6 and 7 are essentially interchangeable in their effectiveness. When used in conjunction with Question 3 data (Extent Task Is a Part of the Position), they yield a composite measure of appropriate training content. Overall, when applied to several kinds of occupations, that measure was highly effective and useful.

These results were confirmed in a study of 540 tasks, 180 in each of three diverse occupations. Multiple combinations of data from seven distinctly different kinds of task questions were compared against criterion training content established for each occupation. This criterion content was generated by a composite of task judgments that represented both (a) the expectations of employers, and (b) the task content of well-established and accredited postsecondary schools offering such occupational preparation. Refer to Technical Appendix B of Volume 5 for a summary of this study.

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[1] For those readers familiar with the previous occupational survey reports of Center R&D Series No. 108, 109, and 110, Question 6A here is identical to Question 12 in the reports, while Question 7 corresponds to the previous Question 13.

It may be presumed that this particular combination of questions served so well because each question required the raters to combine a number of factors and considerations in their mind and then provide a single summary rating. The two types of measures were only moderately correlated with each other. Addition of any other task information, despite the logic and rationale of such addition, tended only to reduce the accuracy of content identification when averaged across the three tryout occupations, or, at best, added only a very small increase in accuracy. In fact, the combined Question 3 and 6/7 measures appear so robust, regardless of which group of respondents or which relevance measures are used, that good results can be anticipated by any combination of Significance and Learning Location questions, whether answered by workers or supervisors. However, it would be wise to monitor the results of applying these questions to a variety of other types of occupations. At this point in our knowledge, they are the best we can recommend for general use with different sorts of jobs.

Question 4 (Extent Task Is Part of the Job) is a logical extension of Question 3, to provide more options for data gathering. But, its actual effectiveness has not yet been tried out and assessed. It does, however, appear to have merit for use in situations where workers just are not available to provide knowledgeable answers to Question 3.

Some other task questions that have been used at various times by others to identify tasks important for training are noted in the Appendix. These are in addition to those cited in Volume 3, which also have on occasion been used as the basis for making training content decisions. The merit and use of such other task questions remains a meaningful research issue. The studies underlying the process described in this volume did assess several of these other questions. Though some were of value in relation to one type of occupation, they generally did not serve well enough across several occupational types to be considered of generalizable usefulness. In some instances, certain measures may prove effective, but the number of responses per task would need to be infeasibly large to produce stable and reliable group data. Additional research on this problem is currently underway at the Occupational and Manpower Research Division (AFHRL/AFSC) of the U.S. Air Force. The reader should be alert to their research findings as they become available.

Questionnaire options for surveying a single occupation. Questionnaire Types A, B, D, and E (but not Type C) serve as the basis for adding Questions 6 and 7 to the Task Inventory Questionnaires. Under Condition I (as defined in Volume 3), four expanded TIQ types are possible. Two use the earlier Type A as their basis; and the other two use the earlier Type B. Type C was not considered appropriate as a basis, since no confirmatory relevance data are obtained from supervisors.

- Type K, using Question 6A with workers, added to Question 3 of Type A.
- Type L, using Question 7 with immediate supervisors, added to Question 2 of Type A.
- Type M, using Question 6 with workers, added to Question 1 of Type B.
- Type N, using Question 7 with immediate supervisors, added to Question 2 of Type B.

Under Conditions II and III (as described in Volume 3, Step 8) two parallel survey types can possibly be used.

- Type O, using Question 7 with immediate supervisors, added to Question 2 of Type D.
- Type P, using Question 7A with immediate supervisors, added to Question 4 of Type E.

These six expanded TIQ types are summarized in Figure 2, along with a brief indication of when each might be used. There is no one type that is right for all occasions, though Type N would likely

Summary of Questionnaire Types for Surveying Task Selection Surveys:

Condition	Comparable Relevance TIQ Type	Selection TIQ Type	Workers		Supervisors	
			Group 1	Group 2	Group 1	Group 2
I	A	K	Questions 3-6A		Question 2	
		L	Question 3		Questions 2-7	
I	B	M	Questions 1-6	Question 3	Question 2	
		N	Question 1	Question 3	Questions 2-7	
II	D	O	Question 1		Questions 2-7	Question 4[a]
III	E	P	Question 1		Questions 4-7A[b]	

[a]or, alternatively, use of Questions 2-13.
[b]or, alternatively, use of Questions 2-7-13.

Recommended Options for Different Levels of Available Respondents:

Availability of Workers	Availability of Immediate Supervisors: Very Many and Knowledgeable	Many and Knowledgeable	Few or Limited Knowledge
Very Many and Experienced	Type N	Type N	Type M
Many and Experienced	Type L	Type L	Type K
Relatively Few	Type O	Type P	None Appropriate

Figure 2. Summary of questionnaire options for surveying both task relevance and training need in a defined occupation.

be the more commonly applicable version. It is usually preferable to obtain responses to Question 1 as it, by itself, is a more accurate measure of task *non*-relevance for training purposes than are Questions 2, 3, or 4 by themselves. *NOTE:* Since Types O and P involve the application of the untested Question 4, their effectiveness remains uncertain at this time.[2]

Types K and M will be most useful when time of supervisors to answer questionnaires is hard to obtain, or when supervisors may be asked to rate more than one occupation. Type L will be most useful when worker time to answer questionnaires is hard to obtain. Use Type P when supervisors have sufficient time to respond to both Questions 4 and 7A (since this is a more lengthy combination of questions) and when worker time to answer is hard to obtain. Type K also requires more time for workers to respond. If job relevancy is not in doubt for an occupation's task listing, then Type M can be modified to omit supervisor responses, or Type O can be modified to omit worker responses.

STEP 23: DETERMINE WHAT DATA SUMMARIES AND ANALYSES ARE NEEDED

Summary descriptive data. Printout formats of summary descriptive data for the Learning Location questions are illustrated in Tables A-6 and A-7 of Volume 5. These illustrations are for a secretarial occupation, reproduced from a 1974 eight-state survey (Ammerman, Pratzner, & Burgin, 1975). Table A-6 data represent responses on Question 6A, where workers answer for all tasks after answering significance Question 3. Table A-7 data represent responses on Question 7, where supervisors answer only for tasks checked on occurrence Question 2. The scale values and categories for the questions are based on the response categories shown in the figures accompanying Step 24.

From the values noted in comparing Tables A-6 and A-7 of Volume 5, it is obvious that many persons will suggest a learning location on Questions 6A or 7A, even though these same persons indicate on significance Questions 3 or 4 that the task is not part of the position or job. No attempt is made in the summary of these data to restrict the Learning Location answers to only those tasks which respondents indicate are of some significance on Question 3 or 4. Such restriction is made, however, for summaries of Learning Location when answered along with occurrence Question 1 or 2.

Data analyses intended. In addition to the possible analyses of descriptive task-relevance data cited in Volume 3 (Step 10) for a single occupation, comparable analyses for Learning Location questions are also appropriate. Guidelines for doing this remain essentially the same as those given in Step 20, Volume 3.

The primary addition to the data analyses is the use of the task data to select job performance content that is appropriate for inclusion in training programs. Specific directions for doing this are given in Steps 25 and 26.

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[2]For those readers who would prefer not to use Question 4 until its effectiveness has been assessed in a field tryout, an alternate question may be substituted. This is a measure of Job Importance, identified as Question 13 in the Volume 5 computer programs. It is administered in association with Question 2, such that ratings need only be given to tasks checked by supervisors as a desired and expected part of the occupation. Steps 25 and 26 include directions for using Job Importance data in selecting tasks and determining their level of training development. The question format and response scale are cited in the Volume 3 Appendix.

STEP 24: DESIGN QUESTIONNAIRE FORMAT AND FORMS

Expanding upon the procedures and forms given in Step 11 of Volume 3, the new task questions are to be added to the relevance question such that respondents answer the relevance issues before answering any additional question. No one respondent should be asked to rate tasks on more than two questions.

By placing relevancy questions first, respondents may concentrate on reading and understanding the task statements while answering a question about which there is ready familiarity. The second question may then be more complex, since prior task familiarity will permit greater concentration on answering the question. All answers should be given to the first question before beginning to rate each task on the second question. This helps prevent prior responses to a task from unduly influencing answers given on the second question. Relevancy Questions 3 and 4 are particularly susceptible to influencing answers on subsequent questions. Packaging survey questionnaires in the units and sequences noted in Figure 2 for a particular expanded TIQ type will help accommodate these concerns.

The Learning Location question answered along with Question 1 or 2 (Task Occurrence) would be packaged as one questionnaire booklet per respondent. Answer spaces for all questions would be located down the right-hand column opposite each task.

When the Learning Location question is used along with Questions 3 or 4 (Extent the Task Is Part of the Position/Job), the questionnaire should be packaged as two separate booklets. The first booklet lists the tasks, the second provides directions and answer sheets for two task questions. This allows a person to view the task statements directly opposite each answer page.

For the two packaging methods described above, below are suggested the sequences for assembling individual booklets (using Group 1 Workers, TIQ Types M and K, as examples):

Single Booklet

1. Cover, With Respondent Code
2. Brief Introduction
   - Purpose & Intended Uses
   - Supporting Agencies
   - Need for Voluntary Response
   - General Directions
3. Background Information
4. Checklist of Equipment Used (optional)
5. Directions for Each Question
6. List of Tasks, With Answer Space for Questions 1 and 7
7. Reaction Page

1st Booklet

1. Cover, With Respondent Code
2. Brief Introduction
3. Background Information
4. Checklist of Equipment Used (optional)
5. List of Tasks

2nd Booklet

1. Cover, With Respondent Code
2. Directions for Question 3
3. Answer Sheets for Question 3
4. Directions for Question 6A
5. Answer Sheets for Question 6A
6. Reaction Page

Other styles of packaging may be found to be advantageous in particular situations. However, goals for such other packaging styles should be to (a) minimize complexity for the respondent, (b) minimize

effort required to record answers, (c) encourage completion of one question over all tasks before answering the next question, (d) minimize opportunity for errors in marking answers, and (e) simplify the process of keypunching answers onto data processing cards.

Suggested instructions and answer section formats for Questions 6A and 7 are given in Figures 3, 4, 5, and 6.

This section on format and forms is intended to convey guidelines if other task questions should be used instead of or in addition to the ones given here. Several possibilities may be noted in the Appendices of Volumes 3 and 4. This issue of selecting tasks for training is not a closed book. The area is only beginning to be investigated through systematic research.

Auditing and coding of completed questionnaires are much the same as described in Step 17 of Volume 3. The significant addition is that of identifying two-digit codes for the new task questions.

Summary descriptive data would be processed along with that described in Step 19 of Volume 3, to reflect printout tables as illustrated in Volume 5, Technical Appendix A. Coding of responses to Learning Location is described in Volume 5, Technical Appendix A.

DIRECTIONS FOR REPORTING
WHERE EACH ACTIVITY SHOULD BE LEARNED

QUESTION # "Learning Location" 6A

(Please read this page carefully and completely)

1. From your total experience as a General Secretary (with present and previous employers), judge *where* each job activity should be learned. That is, where should a General Secretary make the *main effort to learn* what needs to be known about each activity?

2. This judgment should take into consideration where it is most useful, most feasible, and most practical for such learning to occur, under realistic circumstances. Do not let your judgment be overly influenced by the location or nature of such training that you may have received. Instead, decide where you feel the training would *best* be accomplished for future persons wanting to become qualified in General Secretary positions like those in your office.

3. On the attached Answer Sheets (having a "6A" printed in the upper right corner), *circle* the appropriate answer to the right of the item number for each activity. Use that category which best represents where you feel the main learning effort should be located for that activity. Choose your answers from the following categories:

P = PRIOR to enrollment in a formal job training program (such as in grade school, at home, or in other instructional programs).

T = In a formal TRAINING program or school, before regular employment in the job.

S = On SITE (such as by job experience after employment, on-the-job training, apprenticeship, self-training, or in local training courses after employment as a General Secretary).

E = Through prior employment EXPERIENCE *in a related or lower entry occupation* (but *not* experience in other General Secretary positions).

O = OTHER: (Please *write* your judgment of the proper learning location on the reverse side of the answer page, indicating the item number).

N = There is NOTHING that new General Secretaries would need to learn about the activity (such as when it is not part of the job, or there is nothing of any real substance to learn).

The "N" category should be used for those activities that you believe are not part of the job of General Secretaries. For instance, some activities on the list may be appropriate *only* for Legal Secretaries, Executive Secretaries, Office Managers, General Office Clerks, Receptionists, Clerk-Typists, or other such related jobs in the general fields of secretarial science and office occupations.

Thank you for your participation in this study.

Figure 3. Instruction sheet for Question 6A (workers). This reflects use with Question 3. For use with supervisors, Question 7A instructions would be modified to reflect judgments of where each task should be learned, based on the supervisor's total experience in employing and supervising such workers.

QUESTION # "Learning Location" **6A**

USE THIS ANSWER SHEET FOR REPORTING *WHERE* EACH ACTIVITY SHOULD BE LEARNED

Circle one category for each Activity: the one category which indicates where you believe future General Secretaries should learn what they will need to know about the Activity. Use reverse side of the answer sheet for writing your comments if you use category "O."

Key to abbreviations:

P = PRIOR to training program.
T = In a formal TRAINING program.
S = On SITE, after employment.
E = Related employment EXPERIENCE.
O = OTHER (comments on reverse side).
N = There is NOTHING to learn.

– page 1 –

Item	Locations					
1.	P	T	S	E	O	N
2.	P	T	S	E	O	N
3.	P	T	S	E	O	N
4.	P	T	S	E	O	N
5.	P	T	S	E	O	N
6.	P	T	S	E	O	N
7.	P	T	S	E	O	N
8.	P	T	S	E	O	N
9.	P	T	S	E	O	N
10.	P	T	S	E	O	N
11.	P	T	S	E	O	N
12.	P	T	S	E	O	N
13.	P	T	S	E	O	N
14.	P	T	S	E	O	N
15.	P	T	S	E	O	N

– page 2 –

Item	Locations					
16.	P	T	S	E	O	N
17.	P	T	S	E	O	N
18.	P	T	S	E	O	N
19.	P	T	S	E	O	N
20.	P	T	S	E	O	N
21.	P	T	S	E	O	N
22.	P	T	S	E	O	N
23.	P	T	S	E	O	N
24.	P	T	S	E	O	N
25.	P	T	S	E	O	N
26.	P	T	S	E	O	N
27.	P	T	S	E	O	N
28.	P	T	S	E	O	N
29.	P	T	S	E	O	N
30.	P	T	S	E	O	N

Figure 4. **Answer section format for Question 6A. This answer section would appear separately from the listing of tasks, using a second TIQ booklet (on Type K).**

DIRECTIONS FOR REPORTING WHERE EACH ACTIVITY SHOULD BE LEARNED

QUESTION # "Learning Location" 7

(Please read this page carefully and completely)

1. From your total experience in employing and supervising General Secretaries, judge *where* each job activity that you checked on Question 2 should be learned. That is, where should a General Secretary make the *main effort to learn* what needs to be known about each expected activity?

2. This judgment should take into consideration where it is most useful, most feasible, and most practical for such learning to occur, under realistic circumstances. Do not let your judgment be overly influenced by the location or nature of such training that you or your workers may have received. Instead, decide where you feel the training would *best* be accomplished for future persons wanting to become qualified in General Secretary positions like those in your office.

3. *Circle* the appropriate answer to the right of each activity. Use that category which best represents where you feel the main learning effort should be located for that activity. Do not give answers for activities you haven't checked in the booklet as appropriate. Please mark an answer for all others.

4. Choose your answers from the following categories:

P = PRIOR to enrollment in a formal job training program (such as in grade school, at home, or in other instructional programs).

T = In a formal TRAINING program or school, before regular employment in the job.

S = On SITE (such as by job experience after employment, on-the-job training, apprenticeship, self-training, or in local training courses after employment as a General Secretary).

E = Through prior employment EXPERIENCE *in a related or lower entry occupation* (but *not* experience in other General Secretary positions).

O = OTHER: (Please *write* your judgment of the proper learning location on the reverse side of the answer page, indicating the item number).

N = There is NOTHING of any real substance that new General Secretaries would need to learn about the activity.

Thank you for your participation in this study.

Figure 5. Instruction sheet for Question 7 (supervisors). This reflects use with Question 2. For use with workers, Question 6 instructions should be modified to reflect judgments based on the total job experience of the individual worker.

LIST OF ACTIVITIES

for

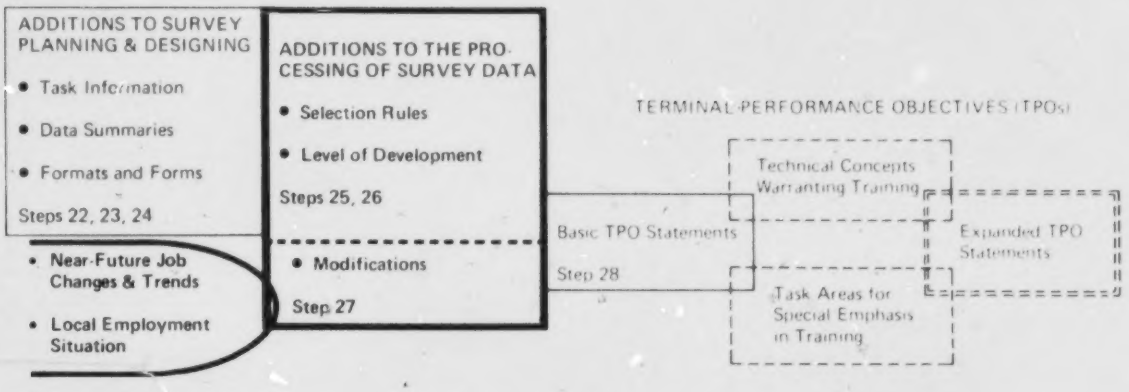
General Secretaries

(Activities are grouped under 12 general duty areas)

	Check ☑ if part of job	CIRCLE ◯ *one* category: P = PRIOR to training; T = Formal TRAINING program; S = On SITE, after employment; E = Related work EXPERIENCE; O = OTHER (write location); N = NOTHING TO LEARN
DUTY A: ORGANIZING AND PLANNING ACTIVITIES		
1. Arrange itineraries for speakers, salesmen, and others.	☐	P T S E O N
2. Arrange for training aids, facilities, and equipment.	☐	P T S E O N
3. Compile one report from numerous small ones.	☐	P T S E O N
4. Decide on least expensive and most desirable way to communicate (telegram, long distance call, etc.).	☐	P T S E O N
5. Develop procedures for the maintenance of news files and reference libraries.	☐	P T S E O N
6. Draft and submit job description.	☐	P T S E O N
7. Draft policy recommendations for submission to higher authority.	☐	P T S E O N
8. Draft recommended changes to handbooks, manuals, publications, and forms.	☐	P T S E O N
9. Establish operating procedures for suspense files.	☐	P T S E O N
10. Establish procedures for the distribution of forms, reports, and publications.	☐	P T S E O N

Figure 6. Answer section format for Question 7.

ACTIVITY I: PROCESSING SURVEY DATA (ADDITIONS TO ACTIVITY F)



Activity I adds three completely new procedural steps to those previously cited in Activity F of Volume 3. These new steps pertain to the actual identification of what job performance content (of that identified as job-relevant by Activity F procedures) most warrant attention by pre-employment training programs, and their appropriate level of development upon completion of training.

- Step 25: Select Tasks That Warrant Training Consideration
- Step 26: Identify Level of Task Development
- Step 27: Modify Task Performance Selections or Levels

STEP 25: SELECT TASKS THAT WARRANT TRAINING CONSIDERATION

After group summary data are available for an occupation, the next step is to use that data to determine for each task whether it is important to be considered in training. The rules employed here for doing this are based on (a) task relevance, (b) significance to the job to be performed, and (c) judgment as to whether formal schooling before employment is the appropriate place to learn what needs to be learned. These variables are as measured by various combinations of Questions 1-4 and 6-7, depending on the TIQ type used.

The survey data contain a number of measures on each task. Those measures used in selecting tasks for training are:

- From Question 1 (Q1:%) – the *percent* of Group 1 Workers checking that a task is performed.
- From Question 2 (Q2:%) – the *percent* of Group 1 Supervisors checking that a task should be performed by their workers.
- From Question 3 ($Q3:\bar{X}$) – the *average* (mean) of ratings given by Workers answering the question for a particular task.
- From Question 4 ($Q4:\bar{X}$) – the *average* (mean) of ratings given by Supervisors answering the question for a particular task.
- From Question 6 or 6A (Q6:T%) (Q6A:T%) – the *percent* of Group 1 Workers suggesting that the main learning location be a formal Training Program or school before employment.
- From Question 7 or 7A (Q7:T%) (Q7A:T%) – the *percent* of Group 1 Supervisors suggesting that the main learning location be a formal Training Program or school before employment.

The basic stages of this selection process, using these task measures, are:

1. REJECT any task as *non-relevant for training purposes* if any pair of the Question 1 or 2 percentage summaries, or of the Question 3 or 4 average ratings, reflect little performance likelihood or indicate a general absence of job significance.
2. COMPUTE PREDICTION COEFFICIENTS for the remaining tasks on the basis of significance ratings (Question 3 or 4), and training program percentages (Question 6, 6A, 7, or 7A percent citing Training Programs as the learning location). These predicted values provide a means for identifying the appropriate level of task development in Step 26.
3. REJECT as *unimportant for training* any task with a predicted value reflecting a task below one having both a moderately low significance rating (on Question 3 or 4) *and* a moderately low school training percentage (on Question 6, 6A, 7, or 7A).
4. CONSIDER all remaining tasks as *important* for some inclusion in training.

Specific questions, values, and procedures are associated with each of these general rules for selecting tasks for training. These are programmed for computer processing from the summary task data. Volume 5 describes the computer program design. Values for both task rejection steps represent empirically established points which provide results corresponding most closely with criterion training content established in earlier studies. The prediction equation for the second stage was derived from the same earlier studies.

The specific question (Q) values and procedures associated with each general rule are:

1st, Reject a task when *any two* of the following should occur for that task:

a. Question 1 percentage is less than 10% ($Q1 < 10.0\%$)

b. Question 2 percentage is less than 15% ($Q2 < 15.0\%$)

c. Question 3 mean score is less than 0.75 ($Q3{:}\bar{X} < 0.75$)

d. Question 4 mean score is less than 0.75 ($Q4{:}\bar{X} < 0.75$)
This score reflects a parallel with Question 3, but remains to be tested for actual effectiveness.

2nd, Estimate the PREDICTION COEFFICIENT ($\tilde{y}$) of each task from TIQ Types K, L, or N, using the relevant nomograph in Figures 7 or 8. This need only be an approximate $\tilde{y}$ value obtained by locating the point on the nomograph at which the Q3 and Q6A/7 summary values intersect. The $\tilde{y}$ coefficient is read from the values given for each diagonal line. These can range from less than 3.1 to 7. Use of the nomographs requires TIQ data to be obtained from groups of respondents as described in these volumes.

For those wishing to compute the prediction coefficients more precisely than possible by this manual system, use the following prediction equations ($\tilde{y}$) as noted for particular TIQ types:

With TIQ Type K

$$\tilde{y} = 1.50 + .67(Q3{:}\bar{X}) + .03(Q6A{:}T\%)$$

With TIQ Types L and N

$$\tilde{y} = 1.90 + .53(Q3{:}\bar{X}) + .05(Q7{:}T\%)$$

With TIQ Types M, O, and P the appropriate prediction equations remain for more precise determination. In the interim, reasonably accurate predicted values may be computed by using the Type L/N equation with Type M and O data. The Type K equation might be used with the Type P data. Or, the average values of each of the two equations could be considered as an interim equation.

An alternate process yielding comparable *ordering* of tasks can be employed for Types M, O, and P with reasonable assurance of the accuracy of the obtained prediction coefficients. This is done by first converting the summary values for each set of data into standard scores (z) having a distribution mean of 0 and a standard deviation of 1. These standard scores can then be combined in a prediction equation as follows:

$$\tilde{y}_{(s)} = 2\left(\begin{matrix}\text{z for Q3:}\bar{X},\\ \text{or Q4:}\bar{X}\end{matrix}\right) + \left(\begin{matrix}\text{z for Q6:T\%},\\ \text{Q7:T\%},\\ \text{or Q7A:T\%}\end{matrix}\right)$$

It is assumed that any computer system used will have a packaged program available for standardizing the scores. The limitation of this standard score approach is the difficulty of interpreting points along the distribution of $\tilde{y}_{(s)}$ predicted values, but the sequence of tasks would be comparable to that yielded by unstandardized prediction equations.

3rd, Reject a task when its predicted value ($\tilde{y}$) is less than 3.10, or below the heavy diagonal line on Figures 7 or 8. When using the tables, this determination can be speeded by first identifying those tasks having Q3 values greater than 2.50. None of these would be rejected. Similarly, no tasks would be rejected having Q6A values greater than 55%, or Q7 values greater than 25%.

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A comparable nomograph for use when using Question 13 (Job Importance) in lieu of Question 4 on TIQ Type O is given by Figure 9. This is also effective when using Questions 7 and 13 in lieu of Questions 4 and 7A on TIQ Type P. The values identified by Figure 9 correspond to the prediction equation

$$\tilde{y} = 1.80 + 1.00(\text{Q13:}\bar{X}) + .056(\text{Q7:T\%})$$

where Q13:$\bar{X}$ is the average (mean) rating given by supervisors answering the Job Importance question for a particular task. This summary value is averaged across all supervisors in the group, with items not checked on Question 2 having a value of 0 in computing the summary value. This equation yields results which are quite useful, but on the average are slightly less accurate than results produced by the other two prediction equations.

- -

When ordering tasks by the alternate process of using standard scores, none of the nomographs can be used directly. The order of tasks on the basis of the standardized $\tilde{y}_{(s)}$ is accurate, but it is not possible to be certain what $\tilde{y}_{(s)}$ standard value corresponds to a raw-score prediction coefficient of $\tilde{y}$.

The best available suggestion for identifying the select-reject point on the distribution of standard $\tilde{y}_{(s)}$ values is to find the $\tilde{y}_{(s)}$ for a hypothetical task having the following summary values:

On Type M, Q3:$\bar{X}$ equal to 1.40 *and* Q6:T equal to 10%.

On Type O, Q4:$\bar{X}$ equal to 1.40 *and* Q7:T equal to 10%.

On Type P, Q4:$\bar{X}$ equal to 1.75 *and* Q7A:T equal to 15%.

This can be determined by locating real tasks having such summary values and using their standard score (z) values in the standardized 2:1 prediction equation. Alternatively, a dummy task having such summary values could be included in the process of converting to standard scores.

$\tilde{y}$ coordinates		
$\tilde{y}$	Q6A:T%	Q3:$\bar{X}$
3.1	54.2	2.42
4.0	83.5	3.72
5.0	117.0	5.22
6.0	150.6	6.71
7.0	184.1	8.21

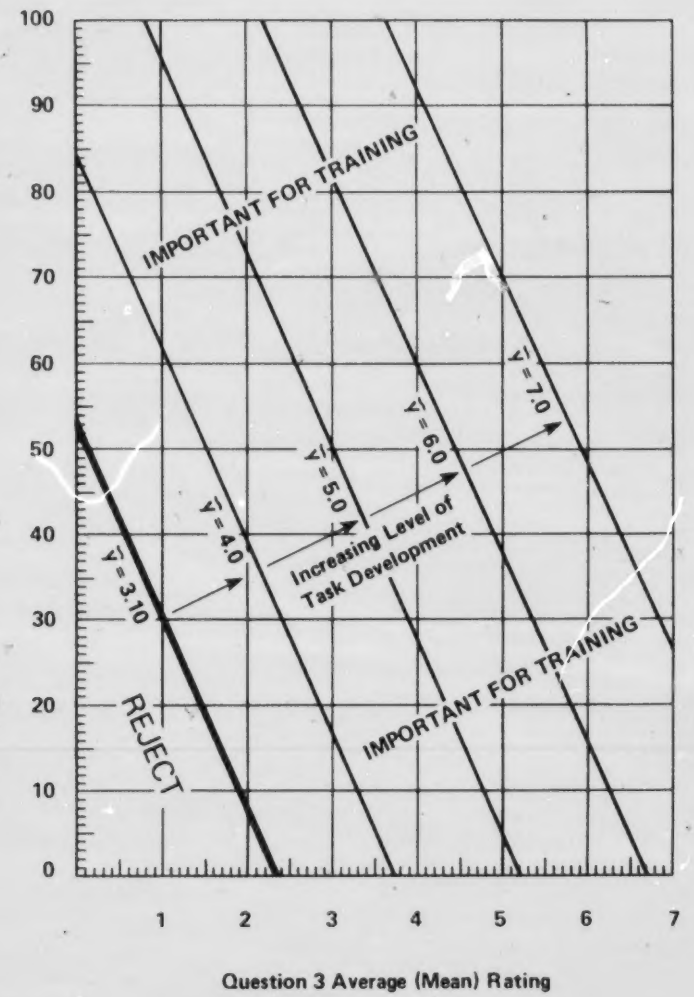


Figure 7. Nomograph for estimating prediction coefficients ($\tilde{y}$) for tasks, based on Question 3 and 6A data of TIQ Type K.

$\tilde{y}$ coordinates		
$\tilde{y}$	Q7:T%	Q3:$\bar{x}$
3.1	23.7	2.32
4.0	40.4	3.95
5.0	59.5	5.82
6.0	78.6	7.70
7.0	97.8	9.57

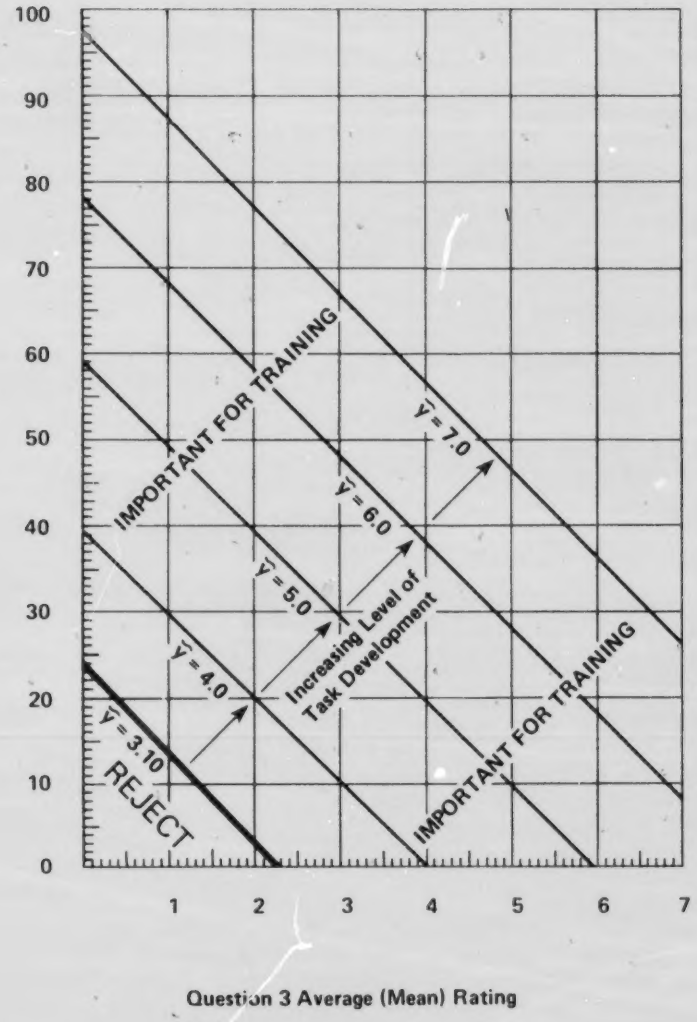


Figure 8. Nomograph for estimating prediction coefficients ($\tilde{y}$) for tasks, based on Question 3 and 7 data of TIQ Types L or N. Also likely to be fairly accurate for data of TIQ Type M.

$\tilde{y}$ coordinates		
$\tilde{y}$	Q7:T%	Q13:$\bar{X}$
3.1	27.2	1.44
4.0	47.0	2.48
5.0	69.7	3.68
6.0	92.4	4.88
7.0	115.1	6.08

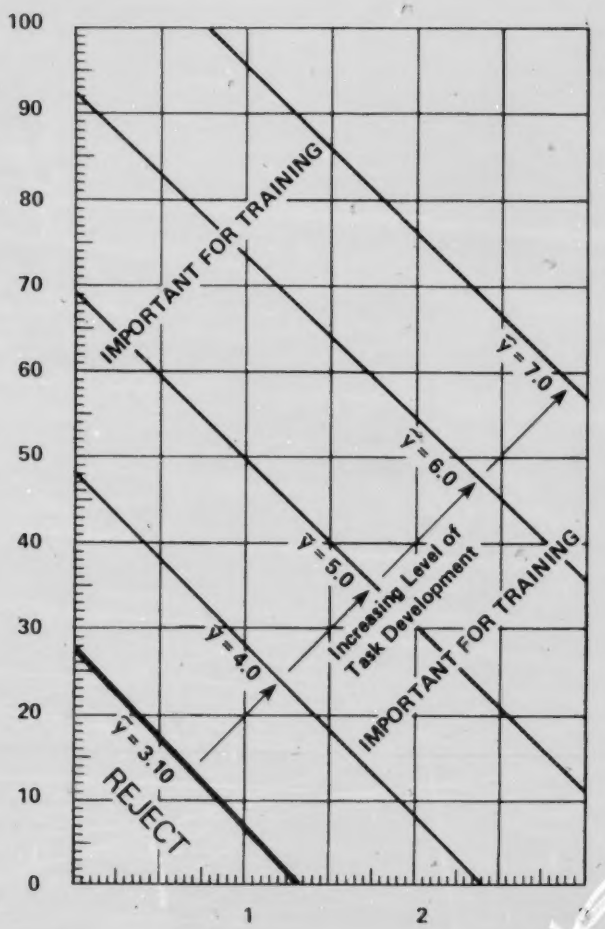
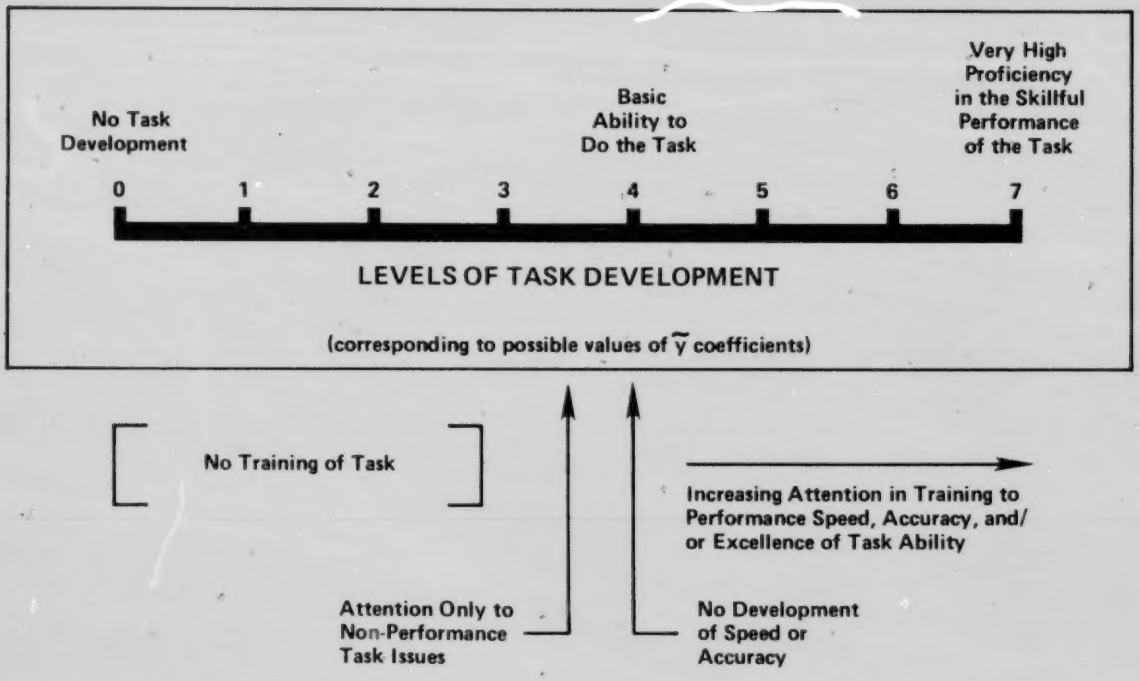


Figure 9. Nomograph for estimating prediction coefficients ($\tilde{y}$) for tasks, based on Question 7 and 13 data of the alternate form of TIQ Types O and P.

STEP 26: IDENTIFY LEVEL OF TASK DEVELOPMENT

In the preceding discussion of Step 25 there was an identification of a predicted value ($\tilde{y}$) for each task. This can be estimated from the nomographs or computed by use of the several prediction equations. For those tasks selected in Step 25 as warranting *some* inclusion in the intended training program, the next question to answer is, *to what performance level should each task be developed?* The predicted value ($\tilde{y}$) is now used directly in identifying the appropriate level of performance development for each selected task.

The predicted values have an expected range of values between 0 and 7, with various points on the scale of $\tilde{y}$ values defined as:



Comments noted just below this scale summarize the training content decisions represented by various levels of task development.

The value of $\tilde{y}$ generated for each selected task in Step 25 is used directly to signify the general level of performance to which each task should be developed in pre-employment training. If the coefficient is near Level 4, then the curriculum should intend to develop a basic ability to perform the task. Performance tests could be administered to test student achievement of this level of ability, but it would be inappropriate for the test to require any special level of speed, accuracy, or excellence of task performance. The higher the development level beyond 4, the greater the standards of performance to be developed in the training program. Level 7 would represent a virtuoso proficiency, in relation to on-the-job performance standards.

A value less than 4 implies that something less than actual ability to perform the task is appropriate, with a possible emphasis on any of a variety of matters other than task performance per se. Such learning emphasis may also be involved with task performance, but can represent training needs in their own right. See the section following Step 28 for a discussion of these issues.

Figure 10 illustrates a distribution of $\tilde{y}$ values for tasks relevant to a hypothetical occupation, for which a little more than half of the tasks warrant development of performance ability and only half of these require proficiency to special levels of performance standards. Some 15% are to be included in the training, but not to involve development of performance capability. About one-third of the tasks apparently are to be of no concern for pre-employment training.

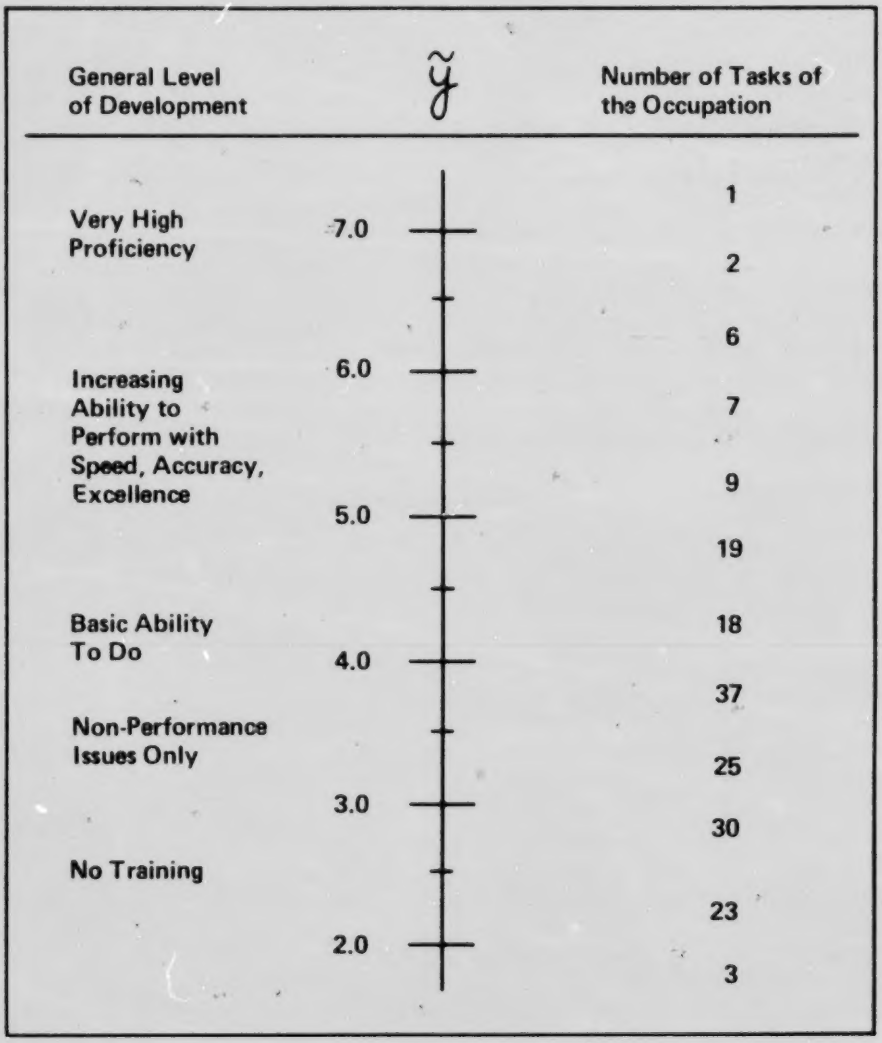


Figure 10. Possible distribution of $\tilde{y}$ values for tasks of a sample occupation.

Each occupational survey will yield somewhat different results. Theoretically the $\bar{y}$ values can range from 0 to 7. However, in practice it is possible to achieve a $\bar{y}$ coefficient greater than 7 on some tasks. Where both the values of task significance and formal training are extremely high, the $\bar{y}$ may go up to 8 or 9. This is an artifact of the way the prediction equations were derived, tending to represent a "best fit" for all types of occupations and data. Any one set of data may not be fit too well by such equations. However, these deviations do not alter the rank order of tasks; the ones at the higher end of the scale still warrant the development of high levels of task proficiency within the training program.

The level of task development identified by the $\bar{y}$ values should be interpreted in relative terms. They do not represent highly precise measurement of development standards for tasks. But they do provide a general indication of each task's appropriate level of training development, allowing distinctions to be made between [No Training] – [Non-Performance Issues Only] – [Basic Performance Ability] – [Advanced Task Proficiency].

STEP 27: MODIFY TASK PERFORMANCE SELECTIONS OR LEVELS

The previous Steps 25 and 26 provide an identification of tasks which warrant some training and to what performance level each should be trained. This identification is based on task data obtained via Task Inventory Questionnaires answered by representative workers and/or supervisors in a particular occupation. The identification procedures provide a tested method of processing and using this data routinely. This method is reasonably effective over a variety of occupational types.

It is not, however, a perfect identification process for any one particular occupation. Rather, it is a process that "best fits" a variety of occupations. It would be possible to find a more exact process for each occupation. In some instances, additional kinds of task information could be highly useful. But, where the most accurate process for a particular job is not known, the procedures in this manual should yield a close approximation. Thus, the user should be aware that there will be some degree of error in task selections, rejections, and levels of development.

It is recommended that the user examine the results of Steps 25 and 26 in the light of other information available or which can readily be obtained. The listing of selected tasks and their development levels should then be modified to reflect this additional information about the job. Some basis for carrying out this examination exists within the completed Task Inventory Questionnaires, and within the knowledge base of the user or of available job informants. The following should be done to accomplish this examination prior to finalizing the performance content selections in Step 28.

- Examine selections for apparent errors.
- Examine questionnaire comments, reactions, and task additions.
- Examine response differences between workers and supervisors.
- Estimate near-future job changes and trends.
- Expand task identifications to include special performance content required by local job situation.
- Expand task identifications to include performance requirements for employment.

Each of these efforts is described in the sections below. In no case should modifications be based on considerations of available training resources or capability. Such considerations would *follow* the statement of Terminal Performance Objectives in Step 28, not influencing the *job-derived* performance content that serves as a baseline for subsequent curriculum decisions.

While these examinations may suggest the need for modifying some of the task content selections, they do not specify how each modification might be determined. This will differ for each situation. It is up to the professional judgment of the user to decide what additional information would be useful to make appropriate decisions in each problem case. The goal of the total process here is to reduce the number of such investigations that may be needed. But there is no way, nor should there be, to completely remove professional judgment from the curriculum identification process. Craft or other advisory committees could be most helpful in accomplishing these reviews and modifications.

Examine selections for apparent errors. By this stage of the content derivation process it can be expected that the persons surveying the occupation will themselves have some knowledge of what job performance content makes sense for training. Additionally, they probably will know of other individuals who could spot obvious errors. This is a perfect place to make effective use of occupational advisory committees.

Review each task selection and rejection to spot errors made by the rules used in Steps 25 and 26. Correct the selection and level identifications to reflect what is known to be appropriate.

This activity is not intended to provide an opportunity to interject preconceived individual biases, but to allow for modification where error is obvious. Caution should be observed not to allow arbitrary unfounded changes to be made. *A record should be maintained* of the nature of any changes and of the reasons for making them.

Examine questionnaire comments, reactions, and task additions. Questionnaire respondents often may provide valuable clues to problem areas that warrant further attention. Comments written in the questionnaire booklets should be scanned for especially noteworthy suggestions regarding possible training needs. These, of course, need review, much as suggested above. Each comment needs to be assessed for its merit. Such comments may point out some critical performance areas that should be trained, even though the task data do not support that conclusion.

The same kind of follow-up of tasks added by respondents to the questionnaire lists may also at times indicate important training needs, especially when a number of persons add tasks in the same general area of the job, or when they also provide supportive comments about an added task.

Summaries of responses on the Reaction Page of each questionnaire may also point out problems with the content selections. Results should be more thoroughly examined when there is an unduly large number of respondents suggesting that the questionnaire or listed tasks did not seem appropriate or adequate for the occupation being studied.

Examine response differences between workers and supervisors. Another cause for obtaining further information about a task occurs when workers differ substantially from supervisors in their group response on a similar task question. The opportunity for noting such differences will exist especially on TIQ Types M, N, and O. In these instances responses to both Questions 1 and 2 (Task Occurrence) are available.

Where worker-supervisor differences are as large as 25% between Questions 1 and 2, even for tasks which appear as non-relevant to the occupation, it is useful to explore the possible reasons for

the difference in viewpoint. Sometimes the reason will be obvious and of no training interest. Other times the reason may be very high concern for training, indicating an activity where worker performance should be shaped by training to conform more closely to supervisor expectations. Occasionally, it may be that supervisor expectations need to be modified to relate more closely to the realities of the work situation.

In determining the need to reconcile these differences through the training program, it helps to consider the other task information available. The job significance (Questions 3 and 4) of a task is particularly helpful. For instance, it may well be that workers and supervisors differ on a task, but if the task it not of very much significance to the job it would seem reasonable not to place much concern on eliminating that difference in training for the occupation.

Differences between the job significance scales (Questions 3 or 4) and the task occurrence measures (Questions 1 or 2) are also possible to note. However, the discrepancies need to be quite obvious. It is not possible to relate significance values directly to occurrence percentages, but major reversals of directions, if any, should be examined.

In performance surveys using other task questions (such as noted in the Appendices to Volumes 3 and 4), additional comparisons may be possible. Differences on any task measure can suggest points where further information is needed to resolve uncertainties.

Estimate near-future job changes and trends. A most important reason for modifying task content selections is to be responsive to emerging job requirements. Occupational survey data concentrate on the job as it presently exists. This is useful knowledge for curriculums in its own right, but it is not quite the whole picture of appropriate performance content that should be of training interest.

In many occupations there may be firm knowledge of forthcoming job changes or of trends occurring over time. This information is most useful in adding to the derived performance content, where pre-employment training is appropriate.

Examples of such changes, emerging as of the time this manual was prepared, are secretarial tasks involving word-processing systems, micrographics for storing and retrieving records, and use of reprographics for copy duplication. These systems may require competence in the operation of automated tape and card equipment, as well as specialized skills in office machinery and the operation of electric and magnetic typewriters. More senior workers may need advanced grammatical and editorial skills to oversee the work of word processor operators.

The occupation of Automotive Mechanics is becoming increasingly concerned with electronic ignitions and emission controls. This occupation also serves to point out the dangers of anticipating even the near-future job changes. Until recently, it was a well known fact that a major manufacturer was all set to produce rotary engines for some of their car models. Accordingly, it might have been concluded that automotive maintenance curriculums should be training new mechanics in tasks related to rotary engines. Intervening, however, was the fuel shortage and accompanying changes in the automotive industry. The particular engine was never introduced, and the appropriateness of training for it was eliminated.

Though we cannot fully anticipate the future, it is useful to consult with experienced specialists in the occupation under study to find out what might reasonably be anticipated in the next one to five years. Product manufacturers and trade or professional associations often are good sources of this information. They should be contacted and asked to identify relevant tasks that would be appropriate for pre-employment training. Information should also be sought on the degree of job relevancy that might be associated with each such task, so that decisions comparable to those of Steps 25 and 26 might be forecast.

By these means, and others that may be available to the user, the content of the training program can better accommodate the training needs of students in the years just beyond completion of training.

Expand task identifications to include special performance content required by local job situation. If the local employment situation involves the performance of tasks that are not characteristic of the contexts used in the occupational survey, then it is quite appropriate to add them to those previously identified. For example, the survey may have yielded task data for the Automotive Mechanics occupation as it is generally performed throughout the nation. Yet, in preparing a curriculum for students in Seattle, a port where foreign-made automobiles enter the country, it is reasonable to include locally important tasks pertaining to the mechanical readying for distribution of such shipped vehicles. Similarly, if a mechanic survey predominantly represented work settings in the southern part of the nation, a curriculum for use in the far north would need to add any significant tasks involved with winterizing vehicles for operation in areas of extreme cold.

Add special local tasks to those identified in a larger, more-representative occupational survey. No deletion is recommended for those tasks which, while meaningful most other places, are not relevant to local employment settings. Thus, the trainee receives occupational preparation for employment in the occupation, wherever future opportunities reasonably present themselves to each individual student, locally as well as in adjacent areas. This does not mean to imply that training programs get overloaded with content unique to certain locales distant from the community where the training is presented, but that the trainee does learn about matters of a broader nature than may be represented in the local community or state.

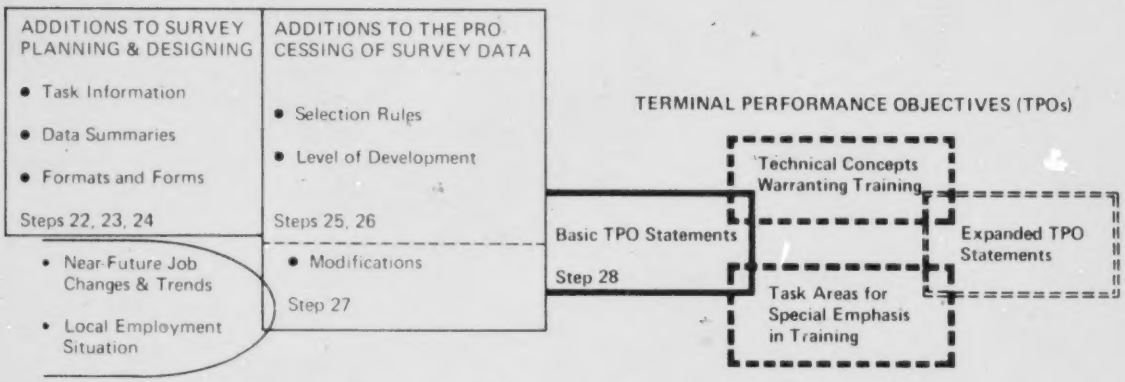
Concern for adding special local performance requirements can arise for most every occupation. Many communities or regions of the country have a heavy concentration of certain businesses and industries which dominate the local employment options for an occupation. Their procedures and equipment may not be characteristic of the occupation as a whole, but be of considerable local significance. It is only reasonable to include these special requirements in the curriculum.

The significance and training need of a locale can be determined by conducting an occupational survey among workers and supervisors in that particular geographical area. This becomes feasible by making using of the task lists and questionnaire formats developed previously, perhaps by others, for a more-representative occupational survey. Differences can then be noted between the results obtained by each survey. Before conducting the local survey, however, it would be useful to add any tasks which were not listed originally, but are of local interest. Refer to Volume 2 for procedures on how to identify and state such tasks.

Expand task identifications to include performance requirements for employment. Over and above the job-derived performance content, include any other performance content that is required for employment. Sources of such requirements are federal legislation, apprenticeship regulations, union contract provisions, state regulatory (licensing) agencies, as well as employers themselves.

Whether or not these additional content requirements are reasonable in terms of relevant job performances, they most likely should be included in occupational preparation programs. Compatibility of training with job placement requirements will likely be enhanced by including these additional considerations.

ACTIVITY J: STATING THE TERMINAL PERFORMANCE OBJECTIVES



This section contains the rationale and instructions for preparing complete statements of each job-derived training objective. Information from preceding phases is used in this preparation, integrating it into meaningful specifications of performance objectives representing the terminal behavior capability expected of each training graduate. The activity in this last stage is to pull together what is known to this point, and to communicate that information for use by others in designing instructional and testing materials (see Activity K for a discussion of possible uses).

Activity J consists of one procedural step and a suggestion for ways of expanding upon the efforts of that step.

- ▶ Step 28: State the Task Performance Content That Warrants Training
- ▶ TPO Expansion to Include Technical Concepts and Task Areas

Terminal Performance Objectives (TPOs) are written statements specifying what a student should be able to do by the time a training program is completed. Derived from actual job requirements, TPOs are the instructional performance goals that are relevant for preparing a student to perform effectively on the job.

TERMINAL PERFORMANCE OBJECTIVE (TPO)
A TPO is a complete statement of a job-relevant learning requirement, stated in terms of task performance relevant to the intended work situation.

For the purpose of this manual, TPOs can be of two kinds. There is a *basic* TPO statement. And there can be an *expanded*, more comprehensive statement of each TPO. The "basic" TPO is described in Step 28, with suggestions for "expanded" TPOs given in the section which follows Step 28.

Complete statements of these learning objectives indicate the specific job-relevant actions that a student should be able to exhibit at the end of instruction. Observation of this behavior would provide the means for measuring and evaluating whether or not the student has learned the necessary component skills and knowledge pertinent to each objective.

Thus, learning objectives are "performance" oriented, with statements worded in such a way that they describe the behavioral capability expected of the training graduate. "Behavior" is a general term used here to describe what the student is able to do (that is, the job activities he can perform).

For purposes of testing student learning and achievement, these actions must be "observable" by such methods as watching the student perform the job task, by recording answers on a paper-and-pencil test, or by judging the adequacy of outcomes or results of the task performance. Therefore, TPOs serve not only as a basis for constructing the Program of Instruction, but also for constructing achievement tests that measure the attainment of each objective.

Clearly stated TPOs provide a primary basis upon which instructional content can be selected, serving as one key referent for designing appropriate learning experiences. These TPOs themselves do not necessarily dictate what the specific instructional content should be, but the tasks elaborated in each TPO are direct statements of job performance requirements. Essentially, items of instructional content are appropriate if they assist the student to achieve the capability stated in the TPO.

It is possible that some derived TPOs may not immediately be attainable. Time, facilities, and local training policy can each contribute to this possibility. To attain certain objectives efficiently may require the development of new job aids or training aids. In some instances it may be necessary to devise and construct equipment simulators to permit economical attainment of an objective. These and other circumstances, nevertheless, would not invalidate a TPO. It remains a goal to be sought, and efforts may then be directed toward making the attainment of each goal feasible.

If a TPO is modified subsequently to reflect behaviors or knowledges which are pertinent only to an instructional setting, or to reflect some decreased fidelity in relation to actual job behavior to accommodate various instructional concerns or constraints, the statement then would be labelled as a "Student Performance Objective." Performance simulations and other forms of Student Performance Objectives may be reasonable approximations of TPOs for immediate training programs, but the degree and nature of their deviation from the TPO should be subject to review and approval by responsible policy boards or others in authority. Deviations from the job-relevant performance requirements of a TPO are one useful means for evaluating the content of particular training programs.

When component elements of task performance are identified as subgoals of the task training, these specific operations and information are called "Enabling Objectives," since they are enablers of the intended terminal behavior capability. They have value in being instrumental in sequencing and pacing the development of student learning.

STEP 28: STATE THE TASK PERFORMANCE CONTENT THAT WARRANTS TRAINING

Structure of Terminal Performance Objectives. Terminal Performance Objectives, to be useful and effective, must clearly identify just what job ability is expected of the student by the time the instructional program is completed. Student demonstration that each ability is attained implies that both the *performance ability* and any significant *levels of performance* have been acquired.

If task performance requires the learning of knowledge, then it also is necessary that the student be able to *use* this knowledge in the performance of the appropriate job activity. If task performance capability is itself not required upon completion of training, but there is technical knowledge or other matters to be learned, then ability to use such knowledge in the performance of the task cannot be an intended learning requirement. Knowledge in this instance would have to be tested independent from task performance, such as in the more traditional fashion of school paper-and-pencil testing.

The basic statement of a Terminal Performance Objective derived by these procedures includes the following three items:

1. The general behavior with regard to a job task which is expected of the graduate trainee as evidence of attainment of the objective.

2. The level of performance to which a task is to be developed in training.

3. The typical or special job conditions under which the graduate trainee should be able to demonstrate performance, serving to define or limit the situation in which end-of-course capability is desired. These conditions may be stated in either of two forms: (a) listed separately, serving to characterize the job performance context for several or all objectives; or (b) included as a part of the basic TPO statement.

Together these three components prescribe the performance capability intended to be developed by students, and the general nature of any performance standards for such performance. These general standards are the ones associated with the levels of task development. Though these general standards do not provide complete specification of testing standards for use in performance evaluations of student achievement, they do identify which tasks warrant specific advanced standards.

To each statement of a Terminal Performance Objective must subsequently be added the detailed information which defines the component behavior or prescribes the procedures of the activity. It is in such detailed materials that the specific knowledges and skills needed by the student are stated. This material would be generated through task descriptions and analyses, as necessary, depending upon the knowledge base that is assumed for the designer of learning experiences and instructional materials. This activity is beyond the scope of the present procedures, but represents the point at which the subject matter expertise of instructors and of developers of instructional materials may be of optimal value.

Task data available for preparing the basic TPO statement. By this stage of the content derivation process the developer possesses a broad awareness of the nature of the occupation and of the employment contexts in which the work is performed. The scope definition process of Step 1 (Volume 2) serves to provide much of this characterization of the work. Added to this is the respondent background information obtained and analyzed as a result of Steps 9, 10, 19, and 20 (Volume 3). Supportive of this contextual information base by this point in the process should be a number of knowledgeable informants, possibly including an occupational advisory panel.

Added to these background resources are the data available about each task selected for inclusion in training. These data may include:

Task Relevancy Data

1. Percent of workers (of a given experience range) who perform the task. (Question 1, Actual Task Occurrence)

2. Percent of supervisors who expect their workers to perform the task. (Question 2, Desired Task Occurrence)

3. Apparent major differences that may exist between the proportion of workers performing the task and the proportion of supervisors expecting worker performance.

4. Differences between present task occurrence and near-future estimates of likely task occurrence, if any.

5. Measure of the extent to which the task is considered part of the job. (Question 3 or 4, Significance)

6. Percent of respondents (workers or supervisors) rating the task as at least a "significant" part of the job (rated at Level 4 or higher on Question 3 or 4).

7. Differences between present task significance and near-future estimates of likely task significance, if any.

8. Differences in task relevancy as a function of different worker background characteristics or of different job contexts, as may have been analyzed in Step 20.

9. Measures from any other task questions that may also have been adminstered (such as *how often* a worker performs the task).

Task Training Data

1. Percent of respondents (workers or supervisors) suggesting that the primary learning of the task be acquired through formal training prior to employment. (Question 6 or 7, Learning Location, Category T)

2. Percent of respondents (workers or supervisors) suggesting that the primary learning of the task be acquired on the job site or through work experiences other than formal training prior to employment. (Question 6 or 7, Learning Location, Category S or S+E combined)

3. Ratio of the number of formal training versus job site suggestions as to the primary learning location, providing some sensitivity to the expectations by that particular group of respondents.

4. Level of task development that is appropriate through formal training, as provided by the predicted value ($\bar{y}$).

These data, as available, could be entered on a separate card or page for each task. This would possibly help isolate the available task information prior to the preparation of a TPO statement for each separate task. Each selected task serves as the basis for one TPO statement, such that there will be as many TPO statements as the number of selected tasks.

Preparing statements of each TPO. A task selected for inclusion in training and to be developed to a basic ("4") level of performance ability might then have a TPO stated for it as illustrated in the following example:

Terminal Performance Objective for Automotive Mechanic Task 322

(Basic TPO Statement)

The training graduate is able to *service an automobile hydraulic power brake system* under normal job conditions. This servicing can be completed without error in essential actions or action sequences, though with no special accuracy or speed requirements.

Normal job conditions implied for this task performance include:

1. Mechanic is full-time employee of a medium-to-large new car dealership or independent garage, working in the repair and maintenance shop of the Service Department under the general supervision of a Service Manager or Garage Owner.

2. Performance of repair and service tasks is initiated by a routine Work Order form prepared by the Service Manager, Service Advisor/Writer, or Garage Owner from customer service request or description of malfunction symptoms.

3. Parts Department is collocated on premises, and/or regular arrangements for parts exist with nearby parts supply store.

For development to a very advanced ("6") level of performance ability, the next example of a TPO statement is illustrative:

Terminal Performance Objective for General Secretary Task 401

(Basic TPO Statement)

The training graduate is able to *type business letters* under normal job conditions. This typing can be accomplished with an exceptionally high standard of accuracy and excellence.

Normal job conditions implied for this task performance include:

1. Work is performed in a traditional office setting, with electric typewriter and standard typing aids and furnishings.

2. No undue time pressure or confusion of office routine is experienced, though capacity for normally-expected typing speed of trained secretaries is assumed for task performance.

For the development of technical knowledge background for a task, but not intending that a basic level of task performance ability (less than Level 4) necessarily be learned, the following example of a TPO statement is illustrative:

Terminal Performance Objective for Business Data Programmer Task 343 (Basic TPO Statement)
The training graduate possesses the technical knowledge that is used by programmers to *edit computer programs for effective use of memory*. No job conditions are implied, since ability to apply the knowledge and perform the task are not intended.

These basic statements of Terminal Performance Objectives serve to direct the nature of subsequent efforts in designing performance-oriented learning experiences, or in preparing performance achievement test situations. They incorporate information on what job task is to be included in the curriculum content and level of performance to be developed. Other information from available task relevancy and training data might be used, as meaningful, to support subsequent decisions on the priority of the training need if training resources necessitate a reduction in the number of TPOs that can be included in a particular instructional program.

Levels of development below Level 4, Basic Ability to Perform the Task, imply that little if any actual performance ability should be intended, though other matters associated with that task warrant training.

Levels of development well above Level 4 imply some degree of advanced skill in performing the task should be intended. Whether that advanced skill should pertain to accuracy, speed, and/or other features of excellence in performance will often be obvious from the nature of the task itself. Persons knowledgeable of the occupation can be expected to make reasonable judgments as to the character of that advanced skill, though not necessarily of the specific performance standards that are appropriate for graduates of the training program.

The basic TPOs can be displayed in summary form to report briefly on the task training needs for all tasks of an occupation. One possible summary format is illustrated in Appendix C. That illustration also includes task features warranting special emphasis in training, as are introduced later in the section on expanded TPO statements.

Grouping of TPOs. Completed statements of TPOs can be ordered sequentially within the *duty categories* in which their tasks originally were listed. This grouping retains the structure of the validated list of tasks.

Other groupings of TPOs are also possible. The merit of each type of grouping is dependent on their perceived value in communicating to and assisting those who must make further use of such statements, by providing different structures to the pattern of derived TPOs.

Possible forms by which TPOs might be grouped, other than by duty categories, include:

- Within common types of *information inputs* to each task.
- Within common types of *job action*, as given by the action verb associated with each task.

- Within common types of *elements or items acted upon*, as given by the object of the action verb in each task statement.

- Within common types of *performance contexts or conditions*, as may be given in the job conditions portion of the TPO.

- Within common types of *purposes served*, as may be given by the qualifier portion of the task statements.

- Within common types of *equipment, machines, tools, or job aids used* in performing each task, as implied by the action verb or given by the qualifier portion of the task statement.

- Separately for *core technical features* of the work performed, as opposed to *peripheral aspects* of the occupation (such as occasional supervisory tasks, additional duty assignments, and "housekeeping" chores in which all workers participate).

In the Volume 1 introduction to these procedures, "curriculum" was defined as a structured series of intended learning outcomes. These learning outcomes should be both selected and ordered (Johnson, 1969). The procedures of Volume 4 concentrate upon the selection of intended learning outcomes. The problem of ordering or structuring these outcomes, the TPOs, remains an important challenge for the future. There needs to be a means for indicating any necessary or preferable groupings and orders within and among groupings. This structuring should be one that promotes the learning of the TPOs. It may not necessarily be the same as task groupings found in the work setting, such as intended by the duty categories suggested for the occupational survey listings of tasks.

It would be most desirable if the occupational survey data would contain information that could serve as a basis for indicating appropriate pedagogical groupings of TPOs. We wish it were so. Unfortunately, the answer to this problem remains elusive, though the matrix of tasks and technical concepts mentioned in the next section of this volume may provide some useful clues. Tasks might potentially be sequenced for learning on the basis of incremental development of conceptual knowledges. However, since task groupings for purposes of enhancing learning may differ from groupings meaningful to work performance, it may be fruitless to seek much useful information from occupational survey data.

Quite recently in reviewing this issue, Posner and Strike (1976, p. 665) commented that

> The question of how content *should* be sequenced and ordered has been the subject of educational debates for at least the past 70 years . . . However, no satisfactory answer has been developed, and no adequate prescription is expected in the near future.

Their analysis of the problem does point out the several ways in which content *can* be sequenced, describing five major types of sequencing principles. Mauritz Johnson (1977) suggested that "there appear to be three possible approaches to the problem: logic, consensus, and empirical testing."

Briggs (1968) reviewed a diversity of experimental studies in which learning was sequenced. This review draws heavily from empirical testing approaches to the problem, and particularly references the hierarchical validation studies of Robert M. Gagne.

The reader is encouraged to pursue the many references cited by Briggs (1968) and by Posner and Strike (1976) for means by which TPOs can be meaningfully structured to provide guidance for instructional plans. It appears, however, that more is known about the organizing and ordering for learning of conceptual knowledges, and of procedural components within a task, than there is known about the structuring and ordering of the tasks themselves.

TPO EXPANSION TO INCLUDE TECHNICAL CONCEPTS AND TASK AREAS

As noted at the beginning of this section on Activity J, it is possible and useful to expand the TPO statements to be more comprehensive in their description of the learning objective. This expansion deals with the addition of *area of training emphasis* as an integral part of the TPO statement. This refers to one of the components of curriculum content identification as discussed at the beginning of this volume, The Focus of Volume 4. As stated here, the element of area of emphasis, or *area of task competency,* has not been as fully developed as have the elements of content *inclusion* and *degree of emphasis.* However, sufficient development has occurred to suggest some possibilities for identifying areas of task emphasis. These possibilities are introduced in this section for their potential value and usefulness as may be determined by various users of this volume. The reader is cautioned that these suggestions have not been fully developed and tried out, and their use needs to be assessed in the future. But they do appear to have considerable merit in making it possible to more fully prescribe the Terminal Performance Objectives, and thus be of greater value to curriculum constructors.

Two different forms of *area of training emphasis* are suggested here. One pertains to the identification of *technical concepts* which are classes of specialized knowledge having practical use to workers in the effective performance of a task. The other pertains to *task areas that are to be especially emphasized* in the training of a task. These two forms of area of emphasis are complimentary of each other. Both seem useful in stating more comprehensive TPOs. Each is discussed below in separate sections.

Identification of technical concepts. The procedural steps for inventorying the technical concepts of significance to workers in an occupation were described in a previous publication (Ammerman, Essex, & Pratzner, 1974). Five general types of technical concepts were defined:

1. Processes and functions of the system which are acted upon by the workers.

2. Types of elements (or other objects or devices) of the systems which are acted upon by the worker.

3. Measures, descriptive characteristics of system elements and processes, and other system specifications.

4. System events and conditions.

5. Regulative and organizing principles used by the worker or directly influencing the work.

In more traditional terms, technical concepts appear to correspond somewhat to the instructional topics used by some persons to describe their training content.

It was suggested in that previous publication that it might be useful to relate each significant concept to its use in the performance of specific job tasks. These relationships could be graphically displayed by means of a matrix consisting of rows for each concept and columns for each task selected for training. Checkmarks could be placed in those cells of the matrix where a task use for a concept is apparent. (*NOTE:* A similar matrix can be generated to display the relation of tasks with equipment used or operated, as may be surveyed in the background section of Task Inventory Questionnaires, Step 9.)

More elaborate processes could be developed to describe the nature and extent of each concept task relationship. Along with information about the *job* relevance or significance of both tasks and concepts, such relationship information could be useful in justifying the instructional requirement for each concept.

By knowing the relationship of each concept to worker use of that concept in the performance of specific tasks, a means is thereby available to *teach these concepts for transfer.* Transfer of concept learning from school to on the job situations should be greatly enhanced by student application of such knowledge in the performance learning of multiple tasks which employ that knowledge. West (1973), in a study of bookkeeping curriculums, found that there can be "little transfer *of* the instructional focus on concepts *to* on the job activities" (p. 114). He suggested that "transfer of concepts requires lavish illustration; it does *not* occur otherwise" (p. 195). Performance learning of tasks would seem to provide such illustration.

It should be cautioned, however, that not all tasks of an occupation will require a significant application of knowledge about some technical concept. Nor will all tasks involving concepts require an understanding of the underlying concepts pertaining to a task. Of those tasks involving concepts, West (1973, p. 127) distinguished between three types:

- Routine operations involving bookkeeping concepts that can be carried out by a person who is shown what to do, without the need to understand the underlying concepts,
- Bookkeeping activities requiring understanding of the underlying concepts,
- Activities based on general and particular understandings of business operations not unique to bookkeeping/accounting.

Similar distinctions may be useful for other types of occupations.

Identification of task areas for special training emphasis. In addition to the cognitive task areas identified by technical concepts, there is also the possibility for identifying particular kinds of matters that might be especially important to emphasize in the training for a task. Eleven such matters are defined and incorporated in a task questionnaire format in Appendix B.

By administering the questionnaire to employer management personnel who are knowledgeable about the skill requirements for new employees in a particular occupation, it is possible to relate areas of emphasis to specific tasks. Where many persons, perhaps one-third or more of the respondents, note that a certain area is pertinent to the expected training of a task, then that identification could be included in the TPO statement.

The 11 task-related areas used in the Appendix B questionnaire fall into three general categories: JOB CONTEXT issues, PERSONAL issues, and TECHNICAL issues. The areas under each category are labelled as:

JOB CONTEXT

1. Task Order and Timing
2. Task Value and Purpose
3. Safety
4. Varied Work Conditions

PERSONAL

5. Relating to Others
6. Worker Attitude and Responsibility

TECHNICAL

7. Basic Educational Skills
8. Detecting Discrepancies
9. Technical Knowledge
10. Supportive Job Aids
11. Alternative Methods

These 11 areas represent a composite of task training matters that have been suggested in the past (Miller & Van Cott, 1955; Miller, 1965; Ammerman, 1966). Additionally, the problem was addressed in an unpublished paper by three consultants (Moss, Sjogren, & Frantz, 1974) as part of the study from which these procedural volumes arose. The 11 areas used in the questionnaire are an attempt to accommodate the various suggestions, but keeping the list to a small number that might best serve the needs of a TPO statement but be reasonable to administer in a task questionnaire. Performance areas of task speed and accuracy are already incorporated within the Level of Task Development scale in Step 26.

Initial tryout of these areas in the Employer Expectation Questionnaire of Appendix B was made using nine employers in each of three occupations. Results were very tentative but encouraging. Further tryouts on a larger scale are needed to establish the merit of this approach. Additionally, the definitions of each of the areas need improvements to more clearly communicate each to the employer respondents. This is particularly true of Areas 4 and 11 which were intended to convey the psychological ideas of "stimulus generalization" and "response generalization."

It remains uncertain that such information can be collected effectively by questionnaires completed by employers. Small-group sessions might be a more reasonable way of obtaining this information, and additional areas could be included. One problem with the small-group approach is that there seems to be a tendency for respondents to over react and cite far too many areas per task. It is not known at this time whether large numbers of persons responding to the questionnaire provide profiles of areas of emphasis for particular tasks that would be similar to those obtained from small-group sessions.

In large measure it seems reasonable to assume that the task capabilities needed by entry workers are those which employers expect. The Employer Expectation Questionnaire in Appendix B illustrates a direct approach to identify these capabilities. Also included in the questionnaire is a task question concerned with the Level of Task Development Expected. This is comparable to the scale of predicted values ($\bar{y}$) described in Step 26. However, average ratings provided by employers would not likely be the same as values produced by the prediction equations of Step 26. The prediction equations were derived from a somewhat different informant source. Employer ratings of task level, though, might be of interest in their own right, but they are not part of the procedural steps described in Steps 1-28. The same computer process that yields Table A-5 in Volume 5 can be used to summarize employer Level of Development ratings of each task.

Preparing expanded statements of each TPO. With this additional data available about each task selected for inclusion in training, the brake servicing task used in the Step 28 TPO illustration might also involve knowledge of the following technical concepts:

General Type of Concept	Technical Concept and Significance Rating: Most Critical Job Significance	Substantial Job Significance	
System Processes and Functions		Air bleed	4.5
		Honing	4.9
		Reface	4.5
		Reseat	4.6

General Type of Concept	Technical Concept and Significance Rating: Most Critical Job Significance		Substantial Job Significance	
System Elements Acted Upon	Axle bearings	5.2	Ball bearings	4.5
	Braking surface	5.0	Cylinder	4.8
	Disc brakes	6.3		
	Hydraulic brakes	6.3		
	Master cylinder	5.9		
	Power brakes	5.0		
	Self-adjusting brakes	5.1		
	Vacuum brakes	5.2		
Measures & System Characteristics	Brake drag	5.4		
	Brake specifications	5.1		
System Events & Conditions	Brake fade	5.6		
Regulative & Organizing Principles				

Similarly, a high number of suggestions may have been elicited that Task Areas 3 (Safety) and 9 (Technical Knowledge) are to be emphasized in the training of the brake servicing task. The Area 9 (Technical Knowledge) emphasis confirms the relatively large number of Technical Concepts having high ratings of significance.

With such additional information the TPO statement could be expanded as illustrated in the following example:

Terminal Performance Objective for Automotive Mechanic Task 322

(Expanded TPO Statement)

The training graduate is able to *service an automobile hydraulic power brake system* under normal job conditions. This servicing can be completed without error in essential actions or action sequences, though with no special accuracy or speed requirements. Additionally, the graduate possesses sufficient knowledge of relevant shop and task safety procedures and precautions to perform the servicing activity without accidents or injury. The knowledge base underlying task performance, in addition to safety matters, concerns the following technical concepts:

1. Key concepts involving system elements acted upon
   - Disc brakes, hydraulic brakes

2. Critical concepts involving system elements acted upon
   - Axle bearings, braking surface, master cylinder, power brakes, self-adjusting brakes, vacuum brakes

3. Critical concepts involving measures and system characteristics
   - Brake drag, brake specifications

4. Critical concepts involving system events and conditions
   - Brake drag

5. Important concepts involving system processes and functions
   - Air bleed, honing, reface, reseat

6. Important concepts involving system elements acted upon
   - Ball bearings, cylinder

Normal job conditions implied for this task performance include:

(same conditions as cited for basic TPO statement.)

Similarly, below is an expansion of the TPO for the typing task cited earlier, involving emphases on basic educational skills and various technical concepts:

Terminal Performance Objective for General Secretary Task 401

(Expanded TPO Statement)

The training graduate is able to *type business letters* under normal job conditions. This typing can be accomplished with an exceptionally high standard of accuracy and excellence. Additionally, the graduate possesses and can apply basic educational skills involved in the following technical concepts:

1. Key concepts involving system elements acted upon
   - Punctuation

2. Critical concepts involving system processes and functions
   - Editing (e.g., page numbering, word usage, grammar)

The knowledge base underlying task performance, in addition to basic educational matters, concerns the following technical concepts:

1. Key concepts involving system processes and functions
   - Correction typing (e.g., erasers, erasing shields, cover up or correction carbon, erasing ribbon, strike over corrections)

2. Key concepts involving system elements acted upon
   - Business letter elements (e.g., letterhead, date line, inside address, attention line, salutation, subject line, body of letter, complimentary close, company signatures, reference initials, enclosure notation, postscript, carboncopy notation, blind-carbon-copy notations, page 2 heading)

3. Key concepts involving measures and system characteristics
   - Effective letter characteristics (e.g., brief, complete, easy to read, up-to-date language, *start*, ending)

4. Key concepts involving regulative and organizing principles
   - Business letter styles (e.g., semiblocked letter, blocked letter, full-blocked letter, indented letter, simplified letter)

5. Critical concepts involving system elements acted upon
   - Stationery (e.g., usage of letterheads, second page, envelopes, copies, carbon paper, bond paper)

6. Important concepts involving system elements acted upon
   - Typed page layouts (e.g., spacing, indentations, margins, titles, headings, quoted matter, footnotes, bibliography, index)

Normal job conditions implied for this task performance include:

(same conditions as cited for basic TPO statement)

Expansion of a TPO not involving ability to perform the task itself but involving training emphasis on acquiring technical knowledge relevant to such performance, is suggested in this next illustration:

Terminal Performance Objective
for Business Data Programmer Task 343

(Expanded TPO Statement)

The training graduate possesses the technical knowledge that is used by programmers to *edit computer programs for effective use of memory*. The knowledge base underlying task performance concerns the following technical concepts:

1. Key concepts involving system elements acted upon
   - Auxiliary storage, storage mode

2. Key concepts involving measures and system characteristics
   - Array dimensions, precision

3. Critical concepts involving measures and system characteristics
   - Block size, logical record length

4. Important concepts involving system processes and functions
   - Overlays

No job conditions are implied, since ability to apply the knowledge and perform the task are not intended.

ACTIVITY K: CONSIDERING THE POSSIBLE USES OF TPO'S

The statements of Terminal Performance Objectives convey the content inclusion and emphasis results for use by curriculum planners and developers. As such, they focus further attention in curriculum development upon this identified job content. Their value derives from the confidence that can be placed in that content, as a function of the process by which each was derived.

Given this level of content identification, the TPOs and associated task data now become the basis for accomplishing the subsequent stages of curriculum development and instructional preparation, including the sequencing and designing of learning experiences to achieve the total set of objectives. These next stages may include such activities as:

- Detailed task analyses to identify necessary learning content, consistent with the derived levels and areas of task emphasis.
- Structure and sequencing of learning content to enable student achievement of each TPO.
- Planning and developing the learning experiences, instructional methods, and teaching materials and aids.
- Assessing the appropriateness of the content of published textbooks in relation to the derived TPO goals.
- Developing competency-based tests of TPO achievement, to assess level and/or areas of task development as expressed in the TPO.
- Accomplishing and assessing of performance-oriented functional context training.

In local applications it often is the role of the instructor to determine the enabling content and methods of specific instruction by which each TPO is to be achieved. This makes proper use of their instructional professionalism and technical expertise. It is the determination of *how* something will be taught that professional judgment is appropriate, not in deciding *what* should be the job performance content of the training program. The premise on which the content derivation procedures of this volume are based is that content should be derived from the performance requirements of the occupation, not influenced by instructional constraints nor by the learning characteristics of particular student populations.

Additional uses for the TPOs and associated task data may be found in a variety of other training and employment activities. Among such possibilities, the task information from the occupational surveys and analyses can prove useful in:

- Determining on-the-job training needs, having firm knowledge of the task competencies to be expected from pre-employment training.
- Articulating the curriculum content for secondary-postsecondary programs in occupational preparation.
- Developing competency transcripts for individual students and/or employed workers, enhancing their potential for accomplishing the goals of open entry-open exit instruction through the years of career development.
- Establishing the content validity of employment tests.
- Mapping of job trends over time, through periodic reapplication of the occupational surveys.
- Identifying emerging occupational specialty areas, as determined by clustering surveyed workers into job types.
- Reviewing textbooks and other instructional materials for merit of content.

Where students are to be prepared within one training program for several closely related occupations or job types, all of the TPOs derived for each occupation or job type may be too voluminous for the available instructional time and resources. Such a program consolidation often will necessitate some additional processing of the TPOs. Three ways of consolidating TPOs are suggested here, though users may also identify other acceptable means:

1. *Group TPOs* having common learning elements, such that there can be an economy realized in instructional units and training time.
2. *Omit TPOs* for tasks on which the summary values of both Task Occurrence (Question 1 or 2) and Job Significance (Question 3 or 4, Extent Task Is Part of the Job) are low.
3. *Weight* the relative training significance of each occupation or job type, based on available data for manpower demands and projections, and *omit* proportionate numbers of TPOs separately for each occupation or job type.

Since TPOs are systematically identified by means of a situationally-defined and worker-representative data base, they also may prove useful in validating the content of existing instructional programs and test instruments. The entire process of content derivation can yield useful data for establishing nondiscriminatory licensing and certification requirements in compliance with recent federal guidelines (FEA Guidelines, 1976) on employee selection procedures.

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APPENDIX A
SOME OTHER POSSIBLE TASK-TRAINING QUESTIONS

These additional task questions, complementing those in the Volume 3 Appendix, are cited here for their potential value to the user of this volume, should special circumstances and needs be encountered. Though each may have some value in identifying training needs and performance problem areas for particular occupational areas, these other questions are not part of the process generally recommended in this volume. However, data could be processed in a fashion comparable to the methods cited in Step 19 of Volume 3. These other task questions pertain to such concerns as:

1. Learning difficulty.
2. Performance difficulty.
3. Work experience.
4. Training preparation.
5. Task assistance.

PERTAINING TO LEARNING DIFFICULTY

- Difficulty of Learning the Task (asked of workers)

  How difficult is it to learn each task?

  Response Scale:

  1. Easy to learn.
  2. Easy-to-moderate.
  3. Moderately difficult to learn.
  4. Difficult to learn.
  5. Very difficult to learn.

  Reference: Mager & Beach, 1967; Morsh & Archer, 1967.

- On-the-Job Learning Difficulty (asked of workers)

  How practical is it to learn this task on the job?

  Response Scale:

  1. Practical.
  2. Minor problems.
  3. Many problems.
  4. Major problems.
  5. Practically impossible.

  Reference: Chamberlain, 1964.

- Difficulty of Learning the Task on the Job (asked of workers)

  Response Scale:

  1. Can do now.
  2. Can learn in a few hours.
  3. Can learn in a few days.
  4. Can learn in a few weeks.
  5. Can learn in a few months.
  6. Would take more than six months to learn.
  7. Would take more than a year to learn.

  Reference: Morsh & Archer, 1967.

PERTAINING TO PERFORMANCE DIFFICULTY

- Difficulty of Task Performance (asked of workers)

  In relation to the other tasks of your present job, how difficult is this task for you to perform? (or, How much difficulty do you have in performing the task?)

  Response Scale:

  1. Least difficult.
  2. Below average difficulty.
  3. Average difficulty.
  4. Above average difficulty.
  5. Most difficult.
  0. Do not perform this task.

- Task Difficulty (asked of workers or of supervisors)

  How difficult is the task to perform, and what is the nature of the difficulty?

  Response Scale:

  0. Not at all significant.
  1. Slightly difficult.
  2. Moderately difficult.
  3. Very difficult.

  Categories of Difficulty:

  T Training or experience.
  C Complex.
  M Monotonous.
  H Heavy work.
  R Rushed.
  W Working conditions.

  Reference: Fruchter, Morin, & Archer, 1963.

- Possible to Improve Procedures (asked of immediate supervisors)

  Based on your total experience as a supervisor of . . . (workers), do you feel that for some of their activities there *could be a better or more effective way* of doing the activity? That is, of the activities you checked (in Question 2), could an improvement be made on the present way in which the workers typically perform an activity? Then, for those activities you judge could stand procedural improvement, suggest the main *way for improving such procedures.*

  Response Format:

  1. Yes, could stand procedural improvement.
  2. No.

  Method of Improvement Categories:

  H Provide a readable, ready-reference HANDBOOK or similar guide for use on the job. (Example: Dictionary of technical terms, or of equipment parts)
  D Expand, correct, or clarify the existing DIRECTIVES on the matter.
  T Improve the content of formal school TRAINING on the matter.
  R Provide RESEARCH or special study for improving the present methods or procedures.
  ? I don't know how it might be improved, but I think it can.
  O OTHER (write in your suggestions, indicating the task number).

  Reference: Ammerman & Pratzner, 1974.
  This corresponds to Question 9 for which the computer program of Volume 5 calculates summary values.

■ Poorly Performed Task (asked of immediate supervisors)

Based on your total experience as a supervisor of . . . (workers), do you feel that *many* workers perform certain of their activities poorly or unsatisfactorily, *even after a reasonable amount of time* on the job? That is, of the activities you checked (in Question 2), which ones are usually not done by experienced workers as well as they could be? Then, for those activities you judge to be poorly performed, suggest the main *reason for such performance.*

Response Format:

1. Yes, poorly performed by many.
2. No.

Reason Categories:

I Lack of INTEREST or poor attitude on the part of . . . (workers).
T Ineffective job TRAINING on the matter, in formal school training programs.
M Workers are overburdened with more important MATTERS, and do not have time to perform this activity properly.
D The activity is an extremely DIFFICULT one to master.
? I don't know the reason, but I believe the general performance by many . . . (workers) is poor or unsatisfactory.
O OTHER (write in your suggestion, indicating the task number).

Reference: Ammerman & Pratzner, 1974.

PERTAINING TO WORK EXPERIENCE

■ Time to Qualify (asked of immediate supervisors)

By your standards as a supervisor of one or more . . . (workers), *when* do you expect that a new . . . (worker) should be *capable of satisfactorily performing* each of the activities you checked (in Question 2)? That is, *how soon* after beginning employment as a . . . (worker) do you feel that employee should be able to do each activity with reasonable competency?

Response Scale and Abbreviated Questionnaire Symbols:

W Within the *first* WEEK on the job as a . . . (worker).
M Within the *first* MONTH on the job (but not necessarily within the first week).
3M Within the *first* 3 MONTHS on the job (but not necessarily within the first month).
6M Within the *first* 6 MONTHS on the job (but not necessarily within the first three months).
Y Within the *first* YEAR on the job (but not necessarily within the first six months).
3Y Within the *first* 3 YEARS on the job (but not necessarily within the first year).

Y+ Some number of years beyond the first three years on the job.
O Competent performance is *never* necessary for . . . (workers) in this operation.

Reference: Ammerman & Pratzner, 1974.
This corresponds to Question 8 for which the computer program of Volume 5 calculates summary values.

- Time Interval Before Initial Task Performance (asked of workers)

How soon is the task performed by school graduates?

Response Scale:

0 First month.
1 1 to 3 months.
3 3 to 6 months.
6 6 to 12 months.
12 After 12 months.

Reference: Chamberlain, 1964.

- Experience Needed for Task Performance (asked of workers)

Response Scale:

1. None or less than 1 month.
2. 1 to 2 months.
3. 3 to 5 months.
4. 6 to 11 months.
5. 12 to 17 months.
6. 18 to 23 months
7. 24 months or more.

Reference: Morsh & Archer, 1967.

- Training and Experience Required (asked of workers or of supervisors)

What amount of training and/or experience is required in order to do the task proficiently?

Response Scale:

1. Less than average.
2. Average.
3. More than average.
4. Considerably more than average.

Reference: Fruchter, Morin, & Archer, 1963.

PERTAINING TO TRAINING PREPARATION

- Training Preparation Received (asked of workers)

  What percentage of your present skill level in the task was attained at the completion of technical school training?

  Reference: Fruchter, Morin, & Archer, 1963.

- Extent of Training in School or Work Experience (asked of workers)

  Where did you learn to do the tasks you perform on your job?

  Response Scale:

  1. Learned it all from school training.
  2. Learned almost all of it from school training.
  3. Mostly from school training.
  4. About fifty-fifty school training and work experience.
  5. Mostly from work experience.
  6. Almost all from work experience.
  7. Learned it all from work experience.

  Reference: Morsh & Archer, 1967.

- Method of Learning the Task (asked of workers)

  Response Categories:

  S Formal school training program.
  E Formal training given by employer.
  J On-the-job experience.
  P Technical publication or manual.

  Reference: Morsh & Archer, 1967.

PERTAINING TO TASK ASSISTANCE

- Guidance or Technical Assistance Required to Perform Task (asked of workers)

  What amount of instruction or Technical Assistance is provided to you on the job immediately prior to or during the performance of this task?

  Reference: Chamberlain, 1964.

REFERENCE SOURCES FOR TASK-TRAINING QUESTIONS

Ammerman, H. L., & Pratzner, F. C. *Occupational survey report on business data programmers: Task data from workers and supervisors indicating job relevance and training criticalness* (R&D Series No. 108). Columbus: The Ohio State University, The Center for Vocational Education, December 1974.

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APPENDIX B
EMPLOYER EXPECTATION QUESTIONNAIRE (EEQ)

The EEQ is intended for administration to those persons who are essentially one step higher than the immediate supervisor of workers in the occupation being studied, unless such immediate supervisors are near the top of the particular employing firm or agency. It consists of two task questions dealing with:

1. Level of Task Development Expected
2. Task Areas for Special Emphasis in Training

EMPLOYER EXPECTATION QUESTIONNAIRE

FOR CAPABILITIES OF RECENT GRADUATES OF JOB TRAINING PROGRAMS

–BUSINESS DATA PROGRAMMERS–

Administered as a research project of

The Center for Vocational Education
The Ohio State University
Columbus, Ohio 43210

In collaboration with a network of state curriculum laboratories and vocational research agencies throughout the nation.

This booklet contains three sections. Section A defines the scope of the occupation of Business Data Programmers. Section B asks for some brief background information. Section C asks two questions. Question I asks for your experienced judgment about the level of task performance ability that you expect to be developed by occupational training programs. Question II asks what, if any, training matters should be emphasized for each task. The tasks vary in the degree to which they are relevant to the job and in the extent they warrant training prior to employment.

SECTION A—SCOPE OF THE OCCUPATION OF INTEREST

The focus of this questionnaire is on programs of formal training to prepare students for immediate employment as Business Data Programmers. Formal training programs might be conducted by any of several kinds of institutions. Schools that regularly prepare students for immediate employment include trade or business schools, community colleges, technical institutes, and public school vocational programs.

Graduates of training programs should be qualified as general business data programmers, though their job assignments after employment might be limited to particular programming functions. The training programs would *NOT* be ones designed to prepare students as (a) less than full-fledged programmers such as junior programmer or programming clerk, nor (b) specialized in non-business or peripheral system areas such as engineering and scientific programmer, systems analyst, or computer console operator.

Please answer the questionnaire only in relation to training expectations for the Business Data Programmer as defined below.

> In general, the Business Data Programmer is one who converts statements of business problems to detailed logical flow charts for coding into computer language and solution by means of automatic data-processing equipment. They may analyze workflow charts or diagrams representing business problems to develop a sequence of program steps, write detailed logical flow charts in symbolic form to describe arithmetic and logical operations involved, convert flow charts to language processable by computer, test program adequacy, correct program errors, prepare written instructions to guide operating personnel during production runs, and rework programs to increase operating efficiency or adapt to new requirements. They do *not* typically program scientific data, research analyses, engineering studies, gaming simulations, or machine automation processes. They may specialize in writing programs for one make and type of computer.

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SECTION B—BACKGROUND INFORMATION

1. ☐ ABOUT HOW MANY RECENT GRADUATES OF JOB TRAINING PROGRAMS DID YOUR IMMEDIATE ORGANIZATION HIRE LAST YEAR FOR THIS OCCUPATION? (enter number)

2. ☐ ABOUT HOW MANY PERSONS ARE CURRENTLY EMPLOYED IN THIS OCCUPATION BY YOUR IMMEDIATE ORGANIZATION, EVEN THOUGH THEIR PRESENT WORK ASSIGNMENTS MAY BE LIMITED TO PARTICULAR JOB FUNCTIONS? (enter number)

3. WHAT IS YOUR PRESENT JOB POSITION? (check *one* that is most descriptive, regardless of actual job title used in your agency)

- ☐ Top management or owner.
- ☐ Personnel or Training Director for the organization, or deputy.
- ☐ Member of the personnel, administrative, or training staff of the organization (and including such positions as Employment Interviewer, selection testing staff, Job Analyst, Counselor).
- ☐ Intermediate management; such as Shop Foreman, Department Director, Program Manager, Service Manager.
- ☐ Immediate supervisor of workers in the occupation defined in this study; such as Chief Mechanic, Office Manager, Lead Programmer.
- ☐ Other (please write in): _____

4. WHAT KIND OF EMPLOYING ORGANIZATION OR INDUSTRY DO YOU REPRESENT? (check *one* most appropriate)

- ☐ Agricultural Production
- ☐ Banking or Finance
- ☐ Communications
- ☐ Construction
- ☐ Distribution or Transportation of Goods or People
- ☐ Education or Training
- ☐ Equipment or Vehicle Servicing
- ☐ Food Processing
- ☐ Health or Safety Services
- ☐ Insurance
- ☐ Legal or Law Enforcement Services
- ☐ Manufacturing of Products
- ☐ Mechandising or Sales
- ☐ Natural Resources (other than Agriculture)
- ☐ Personal Services
- ☐ Utility Services (such as power, water, fuel)
- ☐ Other (please write in): _____

5. IS YOUR ORGANIZATION A PUBLIC OR PRIVATE ONE? (check *one* most appropriate)

- ☐ Private Business or Industry
- ☐ Public Agency or Institution (including federal, state, and local government, education, quasi-governmental agency, armed forces)

6. TO WHAT EXTENT DO YOU PERSONALLY PARTICIPATE IN THE PROCESS OF SELECTING AND ORIENTING NEW WORKERS IN THE OCCUPATION DEFINED FOR THIS STUDY? (check *ALL* that apply)

- ☐ Seldom or never participate in the selection or orientation process for these new employees.
- ☐ Process applications and other paper work for employment.
- ☐ Recruit potential applicants.
- ☐ Analyze the functions of the employee position to establish its performance and skill requirements.
- ☐ Advise training institutions on what needs to be taught.
- ☐ Develop standard tests and measures of applicant capabilities or characteristics.
- ☐ Screen applicants on the basis of standard tests and/or biographical information.
- ☐ Observe applicants performing sample portions of the job activities.
- ☐ Review credentials of applicants and evaluate them on the basis of overall information available (including such material as interview performance, references, transcripts, biographical information, test scores, experience background, or likely value to the organization).
- ☐ Interview applicants.
- ☐ Informally advise on applicants' merit and potential for effective work performance.
- ☐ Approve applicants for employment and authorize their hiring offer.
- ☐ Formally train new employees, as necessary.
- ☐ Schedule work assignments of new workers.
- ☐ Directly supervise workers performing in the job position.
- ☐ Other (please write in): _____

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SECTION C—RELATING EXPECTATIONS TO JOB TASKS

INSTRUCTIONS FOR QUESTION I

Question I asks what level of ability do you expect from new graduates?

For each of the listed job tasks, *CIRCLE THE APPROPRIATE NUMBER* "0" to "7" *TO INDICATE THE LEVEL OF TASK ABILITY THAT OCCUPATIONAL TRAINING PROGRAMS ARE EXPECTED TO DEVELOP* in students.

LEVELS OF TASK DEVELOPMENT
This is a rating of the extent that your firm expects that job training programs should prepare students to perform each task of the occupation. The following answer scale is to be used. 0 = NO DEVELOPMENT of the task is expected. 1 = Expect a GENERAL AWARENESS of the task. 2 3 4 = Expect a BASIC ABILITY to do the task. 5 6 7 = Expect VERY HIGH PROFICIENCY in the skillful performance of the task.

Use all eight scale levels, as appropriate.

The ratings of "2" and "3" represent intermediate levels of ability between "GENERAL AWARENESS" and "BASIC ABILITY." Similarly, the ratings of "5" and "6" represent intermediate levels of ability between "BASIC ABILITY" and "VERY HIGH PROFICIENCY." Thus, the scale represents a series of increasingly higher levels of skill development prior to employment in the occupation. Level 4 implies no expectation that any advanced speed, accuracy, or excellence of task performance be developed.

The level of performance ability is that which would be developed prior to actual employment experience. Training conducted after a worker is hired should not be considered when you make your ratings.

INSTRUCTIONS FOR QUESTION II

Question II asks what training areas, if any, do you expect to be particularly emphasized in the training of a task?

Listed below are some suggested training areas that might be emphasized for a task. For convenience these task-related areas are grouped under three categories: JOB CONTEXT, PERSONAL, and TECHNICAL. Please take the time to carefully review and understand each area.

Where some feature other than performance ability is especially important in your expectations for task training, *PLEASE ENTER A NUMBER* from "1" to "11" *TO INDICATE A PARTICULAR TYPE OF TRAINING AREA THAT SHOULD BE EMPHASIZED.* More than one area may be entered for a task. However, *an area should not be marked for each task,* but only where you expect one or more areas to be particularly emphasized in training.

Where appropriate, *WRITE IN ANY ADDITIONAL TRAINING AREA YOU FEEL SHOULD BE EMPHASIZED.*

SOME AREAS THAT MIGHT BE EMPHASIZED IN TASK TRAINING

JOB CONTEXT

1. TASK ORDER AND TIMING

   Recognizing when to do a task, particularly its proper sequence in relation to other work being done on the job.

2. TASK VALUE AND PURPOSE

   Sensitivity to the actual job value, usefulness, need, or importance of a task.

3. SAFETY

   Knowledge of the safety procedures and precautions that should be observed when doing a task.

4. VARIED WORK CONDITIONS

   Ability to do a task under a variety of conditions, events, or circumstances that may occur on the job. These may include hazardous, uncomfortable, uncertain, or stressful situations which place special demands upon the worker.

PERSONAL

5. RELATING TO OTHERS

   Developing skill in relating to other people at work. This may involve teamwork or cooperation, or personal skills in dealing with such people as customers, officials, other workers, or the general public.

6. WORKER ATTITUDE AND RESPONSIBILITY

   Developing special pride in work done. This may deal with feelings toward doing quality work and meeting performance standards, or it may involve personal work habits that influence how well a task gets done (such as being careful, or attentive to details).

TECHNICAL

7. BASIC EDUCATIONAL SKILLS

   Learning the particular elementary reading, writing, arithmetic, or speaking skills needed for effective performance of a task. (This category does not include advanced technical development of literacy and computational skills.)

8. DETECTING DISCREPANCIES

   Recognizing and interpreting the key events and conditions that indicate when something is not meeting performance standards or is deviating from acceptable tolerance limits.

9. TECHNICAL KNOWLEDGE

   Knowing and understanding certain key information, or a particular technical concept that has practical use in performing a task. This might involve knowledge of: vocabulary and nomenclature, subject-matter content, machine characteristics and specifications, organizational or system structure, advanced computational skills, operating principles and theories, rules and standards, or other such technical information.

10. SUPPORTIVE JOB AIDS

    Use of a job aid that assists the worker in doing a task more effectively or efficiently. These aids might be tools, charts, test instruments, checklists, reference guides, templates, procedural manuals, maps, forms, wiring diagrams, or other such devices and memory aids that support task performance.

11. ALTERNATIVE METHODS

    Capability for doing a task in more than one way or more than one type of thing acted upon. Such flexibility may be important for performing unusual or emergency procedures that may be required in actual job performance. In some instances flexible approaches are needed for work on different brands or types of equipment and material.

EXAMPLES:

Before beginning, please study the following examples of the rating procedure:

Tasks of the Job	Question I: Circle the Level of Ability Expected to be Developed in Training	Question II: Where Some Feature Is *Especially Important*, Enter the Task Area(s) to be Emphasized.
	0 = No Development 1 = General Awareness 2 3 4 = Basic Ability 5 6 7 = Very High Proficiency	*Job Context* 1. Order/Timing 2. Value/Purpose 3. Safety 4. Varied Work Conditions *Personal* 5. Relating to Others 6. Attitude & Responsibility *Technical* 7. Basic Education 8. Detect Discrepancies 9. Technical Knowledge 10. Job Aids 11. Alternate Methods
1. Process requests for new or revised reports.	(0) 1 2 3 4 5 6 7	
2. Write programs for research information retrieval.	0 1 2 (3) 4 5 6 7	1 / 9, 11
3. Design report formats.	0 1 2 3 (4) 5 6 7	
4. Prepare statistical summaries of data.	0 1 2 3 4 (5) 6 7	BE AWARE OF WHERE TO GET TECHNICAL HELP.
5. Analyze program evaluations, reviews, or reports for problem identification.	0 1 (2) 3 4 5 6 7	8

In the first task, no school training is expected, and therefore no areas can be emphasized.

For task two, some ability to do it is expected; and it is important for the new worker to know what other tasks relate to this work and need to be coordinated with it. Special training on formats for reporting the information retrieved is expected, as well as ability to use more than one format within the same program.

For task three, basic ability to do it is expected, but no training areas are especially important.

For task four, some skill in performing accurately is expected, and training graduates should be able to seek out assistance as they need it.

For task five, little actual performance ability is expected to be trained, but new graduates are expected to know what discrepancies indicate the existence of a programming problem.

BEGIN YOUR ANSWERS BELOW

PLEASE RATE ALL TASKS ON QUESTION I BEFORE ANSWERING QUESTION II

Tasks of the Job	Question I Circle the Level of Ability Expected to be Developed in Training 0 = No Development 1 = General Awareness 2 3 4 = Basic Ability 5 6 7 = Very High Proficiency								Question II Where Some Feature Is *Especially Important*, Enter the Task Area(s) to be Emphasized *Job Context* 1. Order/Timing 2. Value/Purpose 3. Safety 4. Varied Work Conditions *Personal* 5. Relating to Others 6. Attitude & Responsibility *Technical* 7. Basic Education 8. Detect Discrepancies 9. Technical Knowledge 10. Job Aids 11. Alternate Methods		
DUTY A. SYSTEM ORGANIZING AND PLANNING ACTIVITIES (for Data Services, ADP Equipment Operations, and Data Systems Analysis and Design)											
1. Analyze company operations to determine where most significant improvements can be made.	0	1	2	3	4	5	6	7	_____	_____	_____
2. Analyze data processed to make sure that desired information is obtained.	0	1	2	3	4	5	6	7	_____	_____	_____
3. Analyze functional area reports for format errors.	0	1	2	3	4	5	6	7	_____	_____	_____
4. Conduct on-the-job training for data services personnel.	0	1	2	3	4	5	6	7	_____	_____	_____
5. Develop standards and factors for use in management control systems.	0	1	2	3	4	5	6	7	_____	_____	_____
6. Evaluate work performance of data services personnel.	0	1	2	3	4	5	6	7	_____	_____	_____
7. Inspect methods used to process data.	0	1	2	3	4	5	6	7	_____	_____	_____
8. Orient newly assigned data services personnel.	0	1	2	3	4	5	6	7	_____	_____	_____
9. Maintain training records for data services personnel.	0	1	2	3	4	5	6	7	_____	_____	_____
10. Notify person of prime responsibility of deadlines.	0	1	2	3	4	5	6	7	_____	_____	_____
11. Review operations to devise more efficient procedures.	0	1	2	3	4	5	6	7	_____	_____	_____
12. Serve on inspection teams to evaluate other data systems units.	0	1	2	3	4	5	6	7	_____	_____	_____
13. Coordinate errors in programming logic with programmers.	0	1	2	3	4	5	6	7	_____	_____	_____
14. Develop computer operating instructions.	0	1	2	3	4	5	6	7	_____	_____	_____
15. Evaluate performance history on specific jobs.	0	1	2	3	4	5	6	7	_____	_____	_____

	Tasks of the Job	Question I: Circle the Level of Ability Expected to be Developed in Training (0 = No Development; 1 2 3 4 5 6 7 = General Awareness to Basic Ability to Very High Proficiency)								Question II: Where Some Feature Is *Especially Important*, Enter the Task Area(s) to be Emphasized — *Job Context*: 1. Order/Timing 2. Value/Purpose 3. Safety 4. Varied Work Conditions	*Personal*: 5. Relating to Others 6. Attitude & Responsibility	*Technical*: 7. Basic Education 8. Detect Discrepancies 9. Technical Knowledge 10. Job Aids 11. Alternate Methods
16.	Inform person of prime responsibility of errors in input data.	0	1	2	3	4	5	6	7			
17.	Plan and conduct on-the-job training in data processing equipment operation.	0	1	2	3	4	5	6	7			
18.	Prepare cost reports and cost estimates for data automation equipment.	0	1	2	3	4	5	6	7			
19.	Prepare operating instructions concerning local reports.	0	1	2	3	4	5	6	7			
20.	Prepare recommendations for local operating instructions concerning programs.	0	1	2	3	4	5	6	7			
21.	Schedule machine inspection and repair.	0	1	2	3	4	5	6	7			
22.	Train personnel in method of creating input and using output.	0	1	2	3	4	5	6	7			
23.	Control error correction reruns.	0	1	2	3	4	5	6	7			
24.	Coordinate with staff in the development of new systems.	0	1	2	3	4	5	6	7			
25.	Document new computer processes.	0	1	2	3	4	5	6	7			
26.	Establish systems analysis and design priorities.	0	1	2	3	4	5	6	7			
27.	Estimate systems analysis and design work requirements.	0	1	2	3	4	5	6	7			
28.	Inspect systems analysis and design activities.	0	1	2	3	4	5	6	7			
29.	Prepare recommendations for needed data systems equipment.	0	1	2	3	4	5	6	7			

DUTY B: ORGANIZING AND PLANNING ACTIVITIES FOR PROGRAMMING

30.	Conduct on-the-job training in programming.	0	1	2	3	4	5	6	7		
31.	Coordinate flow of data from one report to another.	0	1	2	3	4	5	6	7		
32.	Coordinate programming requirements with machine configuration.	0	1	2	3	4	5	6	7		
33.	Coordinate with functional areas on programming aspects of new systems being devised.	0	1	2	3	4	5	6	7		
34.	Coordinate with operations on preparation of computer operating instructions.	0	1	2	3	4	5	6	7		
35.	Coordinate with systems designers on programming aspects of reports being developed.	0	1	2	3	4	5	6	7		
36.	Develop local operating procedures for programming.	0	1	2	3	4	5	6	7		
37.	Develop programming aids.	0	1	2	3	4	5	6	7		
38.	Develop program test and maintenance systems.	0	1	2	3	4	5	6	7		
39.	Establish programming priorities.	0	1	2	3	4	5	6	7		
40.	Evaluate proficiency of programming personnel to determine training needs.	0	1	2	3	4	5	6	7		
41.	Evaluate work performance of [illegible]mmers.	0	1	2	3	4	5	6	7		
42.	Identify problem areas [illegible]sting systems.	0	1	2	3	4	5	6	7		
43.	Maintain instruction worksheets for operational programs.	0	1	2	3	4	5	6	7		
44.	Orient newly assigned programmers.	0	1	2	3	4	5	6	7		
45.	Perform program analysis.	0	1	2	3	4	5	6	7		
46.	Prepare correspondence concerning data services.	0	1	2	3	4	5	6	7		
47.	Process request for new or revised reports.	0	1	2	3	4	5	6	7		
48.	Requisition programming aids.	0	1	2	3	4	5	6	7		
49.	Review detail flow charts prior to preparation of programs.	0	1	2	3	4	5	6	7		
50.	Schedule development of programs.	0	1	2	3	4	5	6	7		

CONTINUED UNTIL COMPLETION OF ALL TASKS

Thank you for your cooperation – now we would like to get your reaction:

The following statements and open-ended question provide an opportunity for you to evaluate this approach to the identification of what job training programs are expected to have accomplished for each training graduate. Your judgment and suggestions will be important information in the evaluation of this procedure. Feel free to comment at any point.

Please read each of the following statements about the overall quality of the employer expectation questionnaire. *Circle* the symbol on the right which best describes your feelings about each statement. These symbols are defined as follows:

SA = Strongly Agree
A = Agree
U = Undecided
D = Disagree
SD = Strongly Disagree

1.	The definition of the occupation and its limitations in scope were sufficiently descriptive and broad enough to identify similar employee positions in this firm.	SA	A	U	D	SD
2.	The overall format seemed reasonably simple and straightforward.	SA	A	U	D	SD
3.	I feel reasonably confident that my ratings communicate fairly accurately what we expect recent graduates to have learned in their job training program.	SA	A	U	D	SD
4.	I found it reasonably easy to think of our expectations in terms of the tasks listed in the questionnaire.	SA	A	U	D	SD
5.	The categories and instructions for noting training areas were reasonably clear and understandable.	SA	A	U	D	SD
6.	The task ratings and the training areas seem to be a reasonable way to describe what a new employee is expected to know or be able to do on this type of job.	SA	A	U	D	SD

Would you suggest or recommend the use of an entirely different way of identifying the content of a training program? Please describe.

APPENDIX C
SUMMARY OF TRAINING NEEDS FOR 150 TASKS RELEVANT TO GENERAL SECRETARIES

(taken from a sample of about half of all tasks found relevant to the occupation, to illustrate one possible way of reporting TPOs derived for an occupation)

Relevant Tasks of the Job	Level of Task Development 3 = Non-Performance Issues Only 4 = Basic Ability to Do Task 5 = Do Task to Some Standard of Performance 6 = Do Task With Very High Proficiency	Task Areas to Emphasize
DUTY A: ORGANIZING AND PLANNING ACTIVITIES		
Arrange for training aids, facilities, and equipment.	NO TRAINING	
Arrange itineraries for speakers, salesmen, and others.	NO TRAINING	
Assign personnel to job positions.	NO TRAINING	
Assign space for equipment and supplies.	NO TRAINING	
Assign specific work to individuals.	NO TRAINING	
Compile one report from numerous small ones.	3 (4) 5 6	
Compile periodic reports.	3 (4) 5 6	
Compose copy at the typewriter.	3 4 (5) 6	Basic Education
Compose written directions to other office workers.	3 (4) 5 6	
Decide on least expensive and most desirable way to communicate (telegram, long distance call, etc.)	(3) 4 5 6	
Develop procedures for the maintenance of news files and reference libraries.	NO TRAINING	
Distribute keys to authorized employees.	NO TRAINING	
Draft and submit job description.	NO TRAINING	
Draft policy recommendations for submission to higher authority.	NO TRAINING	
Draft recommended changes to handbooks, manuals, publications, and forms.	NO TRAINING	
Establish operating procedures for suspense files.	NO TRAINING	
Establish procedures for the distribution of forms, reports, and publications.	NO TRAINING	
Handle service calls on equipment.	NO TRAINING	

Relevant Tasks of the Job	Level of Task Development	Task Areas to Emphasize
Hear complaints in office and over telephone.	3 4 (5) 6	Relating to Others
Inspect committee membership lists (names, addresses).	NO TRAINING	
Make arrangements for centralized department to duplicate materials.	NO TRAINING	
Make arrangements for guests or visitors (e.g., entertainment, motel, transporation).	(3) 4 5 6	
Mail or forward personnel records.	NO TRAINING	
Maintain list of personnel authorized to submit purchase requests.	NO TRAINING	
Order supplies of various kinds for the office (from suppliers or central supply department).	(3) 4 5 6	Technical Knowledge
Plan and schedule work assignments and priorities.	(3) 4 5 6	Relating to Others
Prepare agenda for meetings.	(3) 4 5 6	
Prepare and maintain personnel promotion folders.	NO TRAINING	
Prepare drafts of correspondence, directives, or reports.	3 4 (5) 6	
Prepare requests for quotations or proposals.	NO TRAINING	
Prepare requisitions for supplies or equipment.	(3) 4 5 6	
Prepare shipping instructions.	NO TRAINING	
Process requests for substitutions or changes to purchase or delivery orders.	NO TRAINING	
Recommend applicants for employment.	NO TRAINING	
Renew newspapers and magazine subscriptions.	NO TRAINING	
Schedule appointments and conferences.	3 (4) 5 6	
Schedule employee vacations.	NO TRAINING	
Schedule office machine inspections.	NO TRAINING	

Relevant Tasks of the Job	Level of Task Development	Task Areas to Emphasize
Select equipment and supplies to be ordered.	3 (4) 5 6	
Select or order furnishings for office.	NO TRAINING	
Send out invitations.	NO TRAINING	
Write letters of condolence or congratulations.	3 (4) 5 6	Basic Education
DUTY B: PERSONAL ACTIVITIES FOR EMPLOYER		
Acknowledge letters of congratulations.	(3) 4 5 6	
Assist in plans for entertaining, receptions, or dinners.	NO TRAINING	
Confer with employer on policy.	(3) 4 5 6	
Coordinate with other personnel on various matters for employer.	3 (4) 5 6	Relating to Others
Give checks to employer for signature.	NO TRAINING	
Keep list of credit card numbers.	NO TRAINING	
Keep personal business diary for employer.	NO TRAINING	
Make engagements and appointments for employer.	3 (4) 5 6	Value/Purpose; Relating to Others
Make travel arrangements for employer.	3 (4) 5 6	
Prepare day's schedule for employer.	NO TRAINING	
Prepare itinerary or schedule for employer's trips.	(3) 4 5 6	Attitude and Responsibility
Remind employer of engagements, dates, or things to do.	3 4 (5) 6	Order/Timing
Sign employer's mail (his signature).	(3) 4 5 6	Value/Purpose
DUTY C: ASSESSMENT AND TRAINING ACTIVITIES		
Conduct on-the-job training of office personnel.	NO TRAINING	

Relevant Tasks to the Job	Level of Task Development	Task Areas to Emphasize
Demonstrate equipment and procedures	NO TRAINING	
Dispose of unneeded documents and records.	3 (4) 5 6	Value/Purpose
Edit and review correspondence and reports prepared by other staff.	3 4 (5) 6	
Inspect accuracy of entries in personnel records.	NO TRAINING	
Inspect accuracy of figures submitted to employer by other employees.	NO TRAINING	
Inspect material received for completeness and damages.	NO TRAINING	
Inspect travel vouchers.	NO TRAINING	
Prepare audiovisual materials (e.g., transparencies, tape recordings).	NO TRAINING	
Prepare performance reports.	NO TRAINING	
DUTY D: DICTATION-RELATED ACTIVITIES		
Edit letters dictated by employer.	3 4 5 (6)	Technical Knowledge
Take dictation at the typewriter (type dictation as employer dictates).	NO TRAINING	
Take dictation over the telephone.	3 (4) 5 6	
Transcribe (type) copy from dictaphone.	3 4 (5) 6	Technical Knowledge
Transcribe (type) copy from shorthand outline.	3 4 5 (6)	Basic Education
Write group proceedings or conferences in shorthand.	3 4 (5) 6	
Write shorthand from more than one person (but only one at a time).	3 4 (5) 6	

Relevant Tasks of the Job	Level of Task Development	Task Areas to Emphasize
DUTY E: ADMINISTRATIVE ACTIVITIES		
Administer imprest or petty cash funds.	NO TRAINING	
Keep books and/or ledger for any purpose.	3 (4) 5 6	Basic Education
Keep daily attendance of employees.	3 (4) 5 6	
Keep petty cash account.	NO TRAINING	
Maintain stock of business forms.	NO TRAINING	
Order typewriting supplies and equipment (erasers, ribbons, etc.).	(3) 4 5 6	
Prepare employer's business expense statement.	3 (4) 5 6	
Prepare purchase orders, invoices, vouchers, and receipts.	3 (4) 5 6	
Record time card or time clock data on payroll forms.	NO TRAINING	
Secure quotations on supplies (from supplier).	NO TRAINING	
DUTY F: RECEPTION ACTIVITIES		
Collect money from office employees for various purposes.	NO TRAINING	
Direct people to proper office or department.	(3) 4 5 6	Relating to Others
Follow up on written notices for meetings by telephone.	(3) 4 5 6	
Greet callers or visitors.	(3) 4 5 6	Relating to Others
Maintain record of long distance calls.	NO TRAINING	
Make introductions.	NO TRAINING	
Place telephone calls.	3 (4) 5 6	Basic Education
Relay or refer telephone calls to another department.	3 (4) 5 6	

Relevant Tasks of the Job	Level of Task Development				Task Areas to Emphasize
Screen employer's calls.	3	4	(5)	6	Value/Purpose; Relating to Others; Basic Education
Send or receive telegrams or cablegrams.	(3)	4	5	6	
DUTY G: CLERICAL ACTIVITIES					
Address letters and packages.	3	4	(5)	6	
Assemble and staple duplicated materials.	NO TRAINING				
Attach pertinent correspondence to incoming mail to refresh employer's memory.	3	4	(5)	6	
Clean typewriter.	(3)	4	5	6	
Compare copy for legibility and neatness.	3	(4)	5	6	
Edit manuscripts.	3	4	(5)	6	
Make corrections on original and carbon copies.	3	4	(5)	6	
Make folders and folder titles for files (labels).	3	(4)	5	6	
Make notes on incoming mail which employer should see.	3	(4)	5	6	
Prepare material for printer or publisher.	3	4	(5)	6	Technical Knowledge
Prepare or obtain coffee or refreshments for employer or guests.	NO TRAINING				
Prepare travel vouchers.	(3)	4	5	6	
Proofread typewritten copy.	3	4	5	(6)	
Type and correct offset masters (mats or multilith).	(3)	4	5	6	
Type and correct spirit masters.	3	(4)	5	6	
Type and correct stencils (mimeograph process).	3	(4)	5	6	
Type and rule tabular material (tables, columns, rows of figures).	3	4	(5)	6	

Relevant Tasks of the Job	Level of Task Development	Task Areas to Emphasize
Type bids and proposals.	3 (4) 5 6	
Type business letters.	3 4 5 (6)	Basic Education
Type cards (index cards, file cards, "address finder" cards).	3 (4) 5 6	
Type copy in outline form.	3 (4) 5 6	Basic Education
Type copy where all lines end on the right margin (justifying).	3 (4) 5 6	
Type display or decorative type copy.	NO TRAINING	
Type entries on printed forms.	3 4 (5) 6	
Type fill-ins on duplicated letters or bulletins (e.g., letters).	3 (4) 5 6	
Type final copy from rough-draft copy.	3 4 5 (6)	Technical Knowledge
Type information on continuous roll tape (gummed back or self-sealing back).	NO TRAINING	
Type legal agreements.	NO TRAINING	
Type manuscripts or reports.	3 4 (5) 6	
Type memorandums.	3 (4) 5 6	
DUTY H: FILING ACTIVITIES		
Clip and collect magazine articles, or newspapers of interest.	NO TRAINING	
File materials.	3 4 (5) 6	Basic Education
Keep card indexes of various kinds.	3 (4) 5 6	
Maintain cross reference listings.	3 (4) 5 6	
Maintain index of forms and publications.	3 (4) 5 6	
Maintain inventory of forms and publications.	3 (4) 5 6	

Relevant Tasks of the Job	Level of Task Development	Task Areas to Emphasize
Maintain library card catalog.	NO TRAINING	
Merge or revise files.	3 4 (5) 6	
Process and file correspondence.	3 4 (5) 6	
Search for lost materials in files.	3 4 (5) 6	
Sort materials for filing.	3 (4) 5 6	
Transfer records to inactive files.	3 (4) 5 6	
DUTY I: MAIL AND DISTRIBUTION ACTIVITIES		
Calculate postal rates.	NO TRAINING	
Distribute incoming and outgoing mail.	3 (4) 5 6	
Distribute promotional material for events such as charity drives.	NO TRAINING	
Distribute supplies, forms, and publications.	NO TRAINING	
Forward mail.	(3) 4 5 6	
Hand carry items, such as purchase orders or contracts, to the vendor.	NO TRAINING	
Maintain current mail routing guide or distribution lists.	NO TRAINING	
Make up, check, and distribute mailing list.	NO TRAINING	
Mark, attach, or enclose materials for outgoing mail.	NO TRAINING	
Open and read mail.	3 (4) 5 6	
Process outgoing mail.	NO TRAINING	
Receive, time stamp, and route messages.	3 (4) 5 6	
Sign for registered or certified mail.	NO TRAINING	
Stuff, bundle, sort, and/or label outgoing mail.	NO TRAINING	
Take mail to mail room or mail box.	NO TRAINING	
Take mail to post office.	NO TRAINING	

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RELATED PUBLICATIONS AVAILABLE FROM THE CENTER FOR VOCATIONAL EDUCATION

OTHER METHODOLOGIES FOR DERIVING CURRICULUM CONTENT

Related Center publications augmenting the procedures and guidelines of the five volume *Performance Content for Job Training* are:

The initial adaptation of U.S. Air Force occupational survey procedures for application in civilian contexts. This version provides a useful introduction to the methodology of task inventory surveys.

Procedures for Constructing and Using Task Inventories (R&D Series No. 91), March 1973.

Complementing the focus on the task performance content of jobs is the methodology for surveying work-related technical concepts which have practical use to workers in the effective performance of their job. Concept inventory procedures are described and a descriptive report of job significance ratings is given for concepts in the occupations of automotive mechanics, business data programmers, and general secretaries.

Rating the Job Significance of Technical Concepts: An Application to Three Occupations (R&D Series No. 105), December 1974.

Exploratory ways of identifying that work-relevant affect by which workers in an occupation approach their job, their coworkers, and the entire work environment. Procedures are suggested, and initial tryout results are reported, for a promising approach to the identification of those non-technical aspects of the job which contribute to worker satisfaction and success. A companion report is provided for processing the associated worker data.

A Methodology to Assess the Content and Structure of Affective and Descriptive Meanings Associated with the Work Environment (R&D Series No. 98), December 1974.

RCMAT: A Computer Program to Calculate a Measure of Associative Verbal Relatedness (Occasional Paper No. 6), 1975.

OCCUPATIONAL SURVEY REPORTS

Providing field data for establishing the methodology of the five volume *Performance Content for Job Training* are:

Three reports of task surveys conducted for specific occupations. These 1974 surveys were obtained from numerous communities in eight states distributed across the nation. Both workers and immediate supervisors, 200 per occupation, provided task data on an array of experimental questions pertaining to (a) task occurrence, (b) frequency of task performance, (c) task significance to the job, (d) time on job before task qualification is expected, (e) task importance to the job, (f) suggestions of performance problem areas, and (g) primary learning locations for each task.

Occupational Survey Report on Business Data Programmers: Task Data from Workers and Supervisors Indicating Job Relevance and Training Criticalness (R&D Series No. 108), December 1974.

Occupational Survey Report on General Secretaries: Task Data from Workers and Supervisors Indicating Job Relevance and Training Criticalness (R&D Series No. 109), January 1975.

Occupational Survey Report on Automotive Mechanics: Task Data from Workers and Supervisors Indicating Job Relevance and Training Criticalness (R&D Series No. 110), January 1975.

A 1971 survey of workers in one metropolitan area was conducted for entire occupational areas incorporating several specific occupations. Field data were obtained on (a) task occurrence and (b) relative proportion of time spent on each task. The survey reports include comparisons between related occupations, and generate the initial listing of tasks used in subsequent studies of specific occupations within each occupational field.

Automotive Mechanics Occupational Performance Survey (R&D Series No. 86), March 1973.

Secretarial Science Occupational Performance Survey (R&D Series No. 87), March 1973.

Business Data Processing Occupational Performance Survey (R&D Series No. 88), March 1973.

SURVEY OF CURRICULUM DEVELOPERS

Providing information on the activities and needs of curriculum developers is the 1974 survey of more than 300 persons in education and training, both public and private, throughout the nation. The survey analysis emphasizes the responses of curriculum developers concerned with vocational education to the list of 68 work activities, but includes other areas of public education, business/industry, business, government agencies. Responses were given to activity questions pertaining to (a) occurrence of the activity, (b) degree of problem encountered in performing each activity, and (c) activity importance to the job.

Activities, Problems, and Needs of Curriculum Developers: A National Survey (R&D Series No. 115), May 1976.

TASK INVENTORY EXCHANGE

To promote the sharing and general availability of task inventories and of occupational surveys, a central clearinghouse is conducted for the collection and dissemination of materials prepared by agencies in education, labor, agriculture, industry, business, government, the professions, and various special interest groups. Three volumes of a directory of over 800 available task inventories so far have been published. Additionally, a symposium on methodologies was sponsored at which 15 presentations were made to an audience of 158 persons from 26 states, sharing their experiences, problems, solutions, and thinking on various aspects of the issue.

Directory of Task Inventories. Volume 1, 1974 (UN Series No. 6), January 1975.

Directory of Task Inventories. Volume 2, 1975 (UN Series No. 7), 1975.

Directory of Task Inventories. Volume 3, 1976 (UN Series No. 8), 1976.

Proceedings of a Symposium on Task Analyses/Task Inventories (UN Series No. 10), November 1975.